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Some Recent Cases of Poisoning Amongst Animals.*

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In my presidential address to the members of this historic Association last session I endeavoured to indicate the importance of chemistry (and especially of organic chemistry) to the branches of veterinary science and particularly to veterinary toxicology. This evening I propose to direct your attention to a few recent cases of interest from the standpoint of veterinary toxicology. Of the mineral compounds, those of lead and arsenic are the most common causes of fatal intoxications in animals. Some examples of arsenical poisoning were published a few months ago (*Record*, 1929, November 9th, 992) and therefore I need not deal now with the symptoms and *post-mortem* appearances shown in this form of poisoning. I should, however, like to say a word concerning antidotes. The classical antidotes for arsenical poisoning are magnesia, precipitated ferric hydroxide and colloidal iron. The employment of compounds of arsenic, bismuth and mercury in venereal clinics sometimes causes anxiety to medical men owing to the patients exhibiting symptoms of arsenical jaundice and dermatitis, bismuth stomatitis or mercurial stomatitis.

Patients suffering from arsenical poisoning have been treated with sodium thiosulphate *per os* or hypodermically. A detailed account of the value of intravenous injections of sterile solutions of pure sodium thiosulphate in cases of arsenobenzene dermatitis was given by McBride and Dennie in 1922, whilst Semon (*B.M.J.*, 1924, April 12th, 662) states that his results on the intravenous injection of the same compound afford considerable ground for the belief that sodium thiosulphate is a specific, safe and rapid antidote for stomatitis due to mercury, and bismuth and that it possesses real value in counteracting the serious effects of arsenical toxæmia. On the veterinary side, Giles has reported cases of arsenical poisoning in 13 cows (*Veterinary Medicine*, 1929, Dec., 544). After the administration of iron and magnesia, one or two intravenous injections of sodium thiosulphate (one dram in one ounce of distilled water) were given daily for three days. All of the animals recovered and Giles attributes their recovery largely to the use of sodium thiosulphate.

Lead.—Each year many animals, especially cattle, are fatally poisoned by lead compounds, the intoxication being usually acute. Since most of you are acquainted with the chief aspects of lead poisoning, I will here only refer to one case which illustrates the extraordinarily rapid effect which a relatively large quantity of a lead compound may produce on young bovines. Three yearling heifers died suddenly without any apparent illness. The owner stated that he saw one grazing normally when she suddenly dropped, struggled and died. The *post-mortem* examination revealed patches of inflammation in the stomachs, but the intestines were normal. Analysis revealed the presence of lead to the extent of approximately 10 grains per pound of stomach contents. The absence of symptoms of acute lead poisoning is unusual, as is also the high concentration of lead in ingesta which was found in this case. The vehicle of the lead was probably paint, of which there was a tremendous quantity at a depôt on the bank of the stream which provided water for these animals. It appears desirable that the intravenous injection of sodium thiosulphate in conjunction with the oral administration of soluble sulphates should be given a trial in the treatment of lead poisoning in animals.

Barium.—Another mineral poison is barium, the carbonate of which metal is a component of many rat poisons. It is sometimes claimed that barium carbonate is non-poisonous to animals other than rats; but the compound is undoubtedly a deadly poison, especially for birds and pigs, the symptoms being diarrhœa, vomition, staggering and loss of control of movement.

(1) Ten pigs of a herd died a few hours after being fed; the observed symptoms were vomition, staggering and apparent paralysis. The food was found to contain barium carbonate and one grain of barium was separated from one ounce of stomach contents. The source of the barium carbonate in the food was ascertained to be rat poison, which contained about 15 per cent. of this poisonous compound.

(2) Twenty Rhode Island Red fowls died suddenly, the symptoms exhibited being convulsive spasms and rigidity of the limbs. Barium carbonate was found in the crop and gizzard contents of two birds submitted for analysis.

Phosphorus.—Phosphorus is also a component of some rat and beetle killers and has thus caused considerable damage amongst poultry.* Although dogs and cats frequently refuse to eat a phosphorised bait, fatalities amongst these animals due to phosphorus poisoning are by no means rare. In birds "live" phosphorus remains unoxidised for a considerable time, but in other animals phosphorus is rapidly oxidised and it is necessary for the analyst to make a search for the lower oxidation product of phosphorus. You will appreciate that this oxidation of phosphorus will occur the more speedily, the longer the contents of organs are exposed to air, and it is therefore very advisable that when birds, dogs or cats are suspected of having been poisoned, the unopened carcasses should be submitted for analysis. In order to illustrate the different rates of oxidation of phosphorus I will quote three typical cases we have investigated. (1) The whole of a flock of poultry (125 fowls) died, the last survivor being a cockerel which lingered for about a week. Even after the expiry of this time one-fifth part of a grain of free phosphorus was separated from the crop and gizzard contents of this bird.

* The presidential address to the Royal Veterinary College Veterinary Medical Association, delivered on February 18th, 1930.

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(2) Several cats died after about 12 hours' illness, the symptoms being listlessness, salivation and frequent vomition. Phosphorus in the " live " state was found in the stomach of one cat which was submitted for analysis. (3) In a London suburb the owner of a bitch was troubled by the frequent visits of neighbours' dogs to the garden. A dog of one of the neighbours became ill with symptoms of vomition and abdominal pain and died two or three days later. Although free phosphorus was absent, the lower oxidation products were detected in the stomach and intestinal contents. Legal action was taken against a person who was proved to have laid " Rodine " spread on meat for the visiting dogs; inasmuch as it is an offence to expose poison except for the destruction of rats and small vermin, the accused person was fined. " Rodine " contains about two per cent. of phosphorus.

Potassium Nitrate.—Hudson has described the fatal poisoning of a heifer which had been given a pound of saltpetre in mistake for Epsom salts; the symptoms exhibited were trembling, staggering and convulsions, followed by death within half-an-hour (*Veterinary Journal,* 1924, *Jan.*, 39). The presence of comparatively large amounts of nitre in condition powders may sometimes lead to symptoms of nitre poisoning in pigs. For example, ten proprietary powders were mixed with the food of ten young store pigs. Two died in convulsions and a third suffered from convulsions but recovered; this animal, however, showed symptoms of paralysis for some days. The others remained in good condition. Strychnine poisoning was suspected. Similar powders were submitted for analysis and were each found to weigh about 120 grains of which approximately 90 per cent. was potassium nitrate. It appears probable that the medicine was not uniformly mixed with the food and that the affected animals had each consumed much more than the amount in one powder. Kaufmann states that the therapeutic doses are 150 grains to one ounce for the ox and 30 to 120 grains for the pig; the *Veterinary Materia Medica* of Parke, Davis & Co. (6th edition) gives 20 to 60 grains for the pig.

Hydrogen Sulphide.—Another common inorganic compound, hydrogen sulphide, well known to every student of chemistry by reason of its highly objectionable odour, is a very deadly poison. It was used as a poison gas in the Great War (see *Official History of the War*). It may prove poisonous to animals either by the breathing of air polluted with the gas or by the drinking of water containing the gas in solution. The intoxication may be acute, sub-acute or chronic. If there is a relatively high proportion of the gas in the atmosphere, its action is exceedingly rapid, unconsciousness and convulsions being produced. I have seen a youth drop to the floor unconscious by breathing air contaminated with this poison. In the sub-acute form of poisoning the gas acts as an irritant on the mucous membranes of the respiratory organs and causes difficult breathing, convulsions and paralysis. Indigestion, general weakness, anæmia, conjunctivitis and vomition are the chief symptoms of chronic poisoning by hydrogen sulphide. The breathing of air containing one part of hydrogen sulphide per thousand is rapidly fatal to animals and even one part in 1,500 of air is fatal to birds. An interesting article dealing with hydrogen sulphide as a poison has been written by Yant & Sayers (*Journ. Chem. Education*, 1927, 4, 613). In 1928 and part of 1929 the effects of this noxious compound were experienced on a large scale in Suffolk owing to manufacturers of artificial silk discharging an effluent into the River Gipping. The water appeared to be black (owing to the presence of iron sulphide) and evolved a gas possessing a sickening odour and causing coughing and sore throat. During this time a large number of poultry died on some farms and cattle lost condition and gave greatly diminished supplies of milk. A sample of the river water I analysed in 1928 contained about one grain of hydrogen sulphide per gallon, that is to say, about one volume of the gas per hundred volumes of water.

The Ministry of Health held an inquiry in August, 1928, but the findings do not appear to have been published. A graphic account of the damage was contributed to the *Morning Post* in the summer of 1929. An action was brought in the High Court for an injunction and a claim was made for damages for the deaths of cattle, hens, turkeys, and pigs and for the loss of some thousands of gallons of milk (*Freshwater v. British Acetate Silk Corporation*). The injunction was granted and the action for damages subsequently settled.

Carbon Tetrachloride.—Let us now consider a few organic compounds which may prove harmful to animals. One of the simplest organic compounds is carbon tetrachloride, which is prepared by passing chlorine into carbon disulphide in the presence of a catalyst. This drug has been used extensively in hookworm infection and in the treatment of liver fluke. It should, however, be borne in mind that some flocks of sheep appear to tolerate the drug badly and it has been recommended to try it on a few sheep first. The compound is usually administered to sheep in doses of 1 c.c. in capsule; W. H. Martindale recommends a much smaller dose, namely 0·3 c.c. combined with 0·3 gram of crude filicin in 0·4 c.c. of vegetable oil. I am directing attention to some cases of fatalities following the administration of carbon tetrachloride, not with the view of deprecating its value as a remedy, but in order that you may be prepared for the possibility of accidents when employing this drug.

(1) A capsule containing 1 c.c. of carbon tetrachloride was given to each of 85 ewes at noon. Within 30 hours seven had died and several of the others exhibited pain and discomfort. No impurity was detected in the medicine. (2) The viscera of a sheep which had died the day after being dosed with carbon tetrachloride were submitted for analysis. The *post-mortem* examination revealed acute inflammation of the fourth stomach and of the bowels; some sanguineous fluid was present in the abdominal cavity and the liver was enlarged. No common irritant poison was discovered in the specimen. (3) Eighty ewes were dosed with capsules of carbon tetrachloride. Seven were found dead and over 40 others were ill on the next morning. The animals had been fed on dried grains and crushed oats. *Post-mortem* examination showed gastro-enteritis. No impurity was detected in specimens of the drug which were forwarded for analysis. (4) One farmer on the recommendation of another administered one capsule (1 c.c.) of carbon tetrachloride to each of 20 ewes out of 90. On the next morning three were dead and by the afternoon of the following day two more were dead and others were ill. The 70 ewes which had not been dosed remained healthy. The *post-mortem* examination revealed

extensive inflammation of the stomachs and small intestine. The drug was proved by analysis to be chemically pure.

That some bovines are extraordinarily susceptible to carbon tetrachloride is well illustrated by three cases recently published by Wilson and Blackmore (*Record,* 1930, Feb. 15th, 141), who administered 5 c.c. of the drug to each of three Irish dairy cows with the result that they showed symptoms of illness. One of these animals was slaughtered *in extremis,* another died 72 hours after dosage, whilst the third recovered.

I will give one further example I encountered some months ago. Fifteen bullocks were in good condition, although a few were thought to be suffering from hoose. The owner gave to each animal a tablespoonful of a proprietary remedy for hoose. On the next morning one bullock was dead, two died a day later and two others also died. All of the animals were ill, the symptoms being dulness, loss of appetite, slight scouring, fæces containing blood and mucus, temperatures 102° to 104°. The *post-mortem* examination showed congestion of the fourth stomach and small intestine and in one case red petechial spots were observed on some parts of the body. The other organs were normal and no worms were discovered in the lungs or trachea. The viscera were analysed, but no common irritant poison was detected. Feeding cake was examined, but mineral poisons and castor seed were absent. A sample of the medicine was then tested, with the result that it was found to contain about 35 per cent. by weight of carbon tetrachloride. I therefore ascribed the damage to the toxic effect of this compound on the animals.

Alcohol.—Whilst intoxication by alcohol is a frequent problem encountered in medico-legal work, it is of comparatively rare occurrence in animals. Twenty-four pigs after travelling about 20 miles by rail were fed on a mixture of whey, barley meal, maize meal and household waste food. The maize meal was a residual product from a whisky distillery. About four hours after their meal, the pigs were (in the words of the owner) "hopelessly drunk," half of them being unable to stand and the others reeling about in a drunken manner. Two hours later they had almost recovered. The mixed food was submitted for analysis and I found that it contained three per cent. of ethyl alcohol.

Tar Acids.—Phenol and the cresols, compounds separated from coal tar by distillation, are extensively employed as disinfectants and for the preparation of sheep dips. The poisoning of animals by drinking disinfectant containing tar acids is not common. When I have detected tar acids in specimens submitted for analysis, I have usually found on inquiry that disinfectant has been added to the specimens. It is advisable to add nothing to organs or contents which are to be forwarded for chemical analysis. The synthesis of the non-toxic so-called ethereal sulphates from phenolic compounds in the animal organism appears to be a natural protection for the animal against comparatively small quantities of the poisonous phenols. Here is a case of the poisoning of pigs by tar acids:—Twelve pigs which had come from a market by rail were placed in a pen at the railway station and were apparently in good health. On the next morning three were found dead and six very ill. Analysis revealed the presence of one-fifth part of a grain of tar acids in one pound of stomach contents, whilst the skin contained two grains of tar acids per pound or one-fiftieth part of a grain per square inch. Probably the poison had been absorbed through the skin. The pen had been washed out with disinfectant, the walls and floor being saturated with the solution

Strychnine.—The vegetable alkaloids are much more complex compounds and of these strychnine, a constituent of Battles' vermin killer, is responsible for the deaths of a considerable number of foxes, foxhounds, dogs and cats each year. Dogs and cats are very susceptible to the toxic action of this drug and it is therefore a matter of some importance to consider what quantities may be poisonous and what may be regarded as safe therapeutic doses. Some years ago I was consulted on some cases of strychnine poisoning in dogs; one tonic pill had been administered to each of several dogs with the result that some of these exhibited symptoms of strychnine poisoning and two or three died. These attacks were not confined to small dogs; one fully grown collie was amongst the victims. The pills had been purchased from a firm of manufacturing chemists and were said to contain 1/120th grain of strychnine besides quinine sulphate and iron phosphate. I analysed a number of other pills of this batch and in each case found that the amount of strychnine in a pill was 1/120th grain. In a more recent case a cat was given one small pill followed by a drink of hot milk. The owner stated that the animal rolled about in agony; its eyes protruded, it was in a state of terror and died ten minutes after the administration of the medicine. I analysed two similar pills taken from the same box and found that each pill contained 1/60th grain of strychnine. Evidently the cat died from strychnine poisoning. Kaufmann gives the lethal dose of strychnine for a dog as 1/12th to 1/3rd of a grain. Professor Bain in 1894 stated that he knew of cases in which fox-terrier dogs had been poisoned by the administration of 1/40 grain of strychnine and that he had also known fatal effects to be produced by 1/64th of a grain. The therapeutic doses for dogs published in standard works have diminished of late years; thus Gresswell (*Veterinary Pharmacopœa,* 1886) gives 1/50th to 1/20th grain, Banham and Young (*Veterinary Posology*) give 1/200th to 1/30th grain, whilst Wooldridge (*Encyclopædia*) gives 1/500th to 1/50th grain. For the cat, Gresswell (1903) mentions therapeutic doses of 1/124th to 1/200th grain; Hamilton Kirk gives 1/150th to 1/100th grain and states that 1/60th grain has in some cases proved fatal, but that he has never observed any unfavourable sequel from giving 1/150th grain twice daily, even continuing the dose for three weeks (*Diseases of the Cat*). Is strychnine as a tonic for dogs and cats indispensable to the clinician? If it is necessary to employ it for these animals, great caution and attention are evidently required

Birds are not so susceptible to the action of strychnine as dogs or cats. Dr. W. H. White (*private communication*) states that ducks dosed with strychnine do have a spasm sometimes and, if afloat, may topple over and drown. He fed strychnine to chickens for a week without visible effect, but observed that birds would not pick up food dosed with the hydrochloride of the alkaloid. The Bureau of Biological Survey of the United States Department of Agriculture has published the results of some investigations and it is stated that gallinaceous birds (grouse, quail, partridges, prairie chickens) possess a certain immunity

to strychnine poisoning which protects them against injury by poison baits of this kind. Such birds are not injured by doses large enough to kill many ground squirrels. The report states that "experiments such as these indicate that complaints regarding the destruction of game birds by strychnine-poisoned bait are founded upon suspicion rather than upon facts" (*North American Veterinarian*, 1929, Jan., 56). From time to time I have analysed the internal organs of a number of birds, two or three being forwarded for analysis when a number have been found dead. I have found strychnine on five occasions in pigeons, on seven occasions in rooks (14 birds) and in three pheasants, but have not found this alkaloid in chicken. The average amount separated from the crop and gizzard contents of the pigeons was 1/15th grain, from the pheasants 1/45th grain and from the rooks 1/120th grain.

Poisonous Foodstuffs.—Cases of poisoning by linseed cake or meal yielding a high amount of hydrocyanic acid and by cake containing castor beans are still frequently encountered. Here is a case of castor poisoning; a fresh supply of "rolled linseed" was first fed to six cows on a Tuesday evening. They appeared normal on Wednesday evening and gave the usual quantity of milk. On Thursday morning six animals were scouring badly and gave no milk. The symptoms were profuse diarrhœa, complete loss of appetite, cessation of rumination, cold extremities; the temperatures of four were normal, whilst two had a temperature of 105°. The "rolled linseed" was found to contain castor, the poisonous principle of which is ricine. I am not aware of any recent cases in this country of poisoning by *lathyrus sativus* or soya bean meal extracted with trichlorethylene, the causes of which are still obscure. In connection with these poisonous foods, I recommend you to consult two very interesting articles, one entitled "A contribution to the study of lathyrism in the horse and the mule" (Maleval, *Revue Vétérinaire*, 1927, *Feb.*, 69) and the other entitled "The Düren Disease" (Robin, *Revue Gén. Méd. Vétér.*, 1928, *July*, 353).

Bracken.—In connection with poisonous plants I will only refer to bracken. It has been established that this plant produces injury when fed in large quantities to young bovines. The symptoms are very similar to those encountered in the so-called "Düren disease." A heifer was observed to be suffering from loss of appetite and two days later she was scouring and bleeding at the nose and mouth. On the next morning the animal was down and unable to rise; hæmorrhages the size of a pin's head were observed in patches on the skin. The extremities were cold, pulse weak and irregular, mucous membranes pale, respiration laboured and temperature 104·7°. The animal died in the afternoon, when another was found to be ill and died later. The *post-mortem* examination revealed froth in the mouth and nose, blood-stained skin, inflammation of rumen and fourth stomach, the stomachs being covered with hæmorrhages. Blood clots were found in the intestines; the spleen was engorged, whilst the liver and kidneys were normal. Bracken was found in the stomach contents and the animals had been grazing on hills where bracken was growing plentifully. No metallic irritant poison was found in the viscera; evidently bracken poisoning was the cause of death. A paper entitled "Intoxication des Bovins par les Fougères" published by Kerdilès last year on this subject is worthy of perusal (*ibid*, 1929, *January*, 1).

I have already mentioned some cases in which proprietary medicines have caused the deaths of animals. I will add another interesting example: Some cattle were drenched with a proprietary medicine; this was followed by profuse lachrymation, coughing and acute diarrhœa. One animal died, death being apparently due to pneumonia caused by choking. The drench was a complex mixture containing sulphur, magnesium sulphate, potassium nitrate, ginger, aniseed, grains of paradise, and other components. I attributed the damage to the irritant effect of the grains of paradise, some of the drench having apparently entered the respiratory organs. Grains of paradise (*Amomum melegueta*) contain an oleo-resin, paradol, which appears to be similar in composition to gingerol, the pungent oleo-resin of ginger.

In conclusion, may I take this opportunity of acknowledging my indebtedness to past and present colleagues of the College for their invaluable co-operation with the work carried out in my department.

My thanks are especially due to Professor Macqueen who, during the past ten years, has given me the benefit of his wide experience in toxicological matters.

Obituary.

Councillor Percy Easte, J.P., M.R.C.V.S.

"The news of the death of Mr. Percy Easte, which occurred on January 8th, after a short illness, came as a great shock to all those who had been associated with him during nearly 40 years' service with Reid's Brewery and this Company," says Watney, Coombe, Reid and Co.'s journal, *Hand in Hand*.

"Although of a shy and retiring nature, he was a most loyal friend, an indefatigable worker, and a good sportsman.

"In addition to his work in connection with the Sports' Club as Chairman of the Executive Committee, Mr. Easte took a most active part in the affairs of the City of Westminster. As a member of the City Council he has served for many years on several of their Committees, and he has also done excellent work as a member of the Westminster Board of Guardians.

"Mr. Easte was also actively engaged in political work in the Conservative interest, being at the time of his death Chairman of the Executive Committee for the Abbey Division of the Westminster Constitutional Association.

"Last year he was appointed a Justice of the Peace for the County of London.

"In spite of the calls thus made upon his time, Mr. Easte was Chairman of St. Andrew's Club, on the Management Committee of the Western Dispensary and a Governor of the Emery Hill Almshouses.

"A great many of the very large circle of friends who feel his loss attended the funeral service at St. Andrew's Church, Ashley Gardens, and the funeral at Hanwell Cemetery subsequently.

"We extend our sincerest sympathies to his widow and family."

In the twelve months ended December, 3,671,806 cattle were slaughtered in the South American frigorificos, as against 3,526,738 in 1928. The number of sheep was 6,284,223, compared with 4,921,592, and the number of pigs 436,398, as against 343,910.

Hæmatology in Veterinary Practice.

By W. P. Blount, m.r.c.v.s., Centenary Post-graduate Fellow, Department of Anatomy, Royal (Dick) Veterinary College, Edinburgh.

In hæmatology we have a branch of medicine which has been applied with marked success to Man, whereas in veterinary work the subject has been sadly neglected. Primarily, this was due to an imperfect understanding of basic principles, coupled with faulty technique; and hæmatology is now in indifferent esteem owing to a stagnation of old conceptions, and an inability to follow the more modern terminology.

Hæmatology, in its broadest sense, embraces not only the study of the " formed elements " of the blood (*i.e.*, the cells, corpuscles, and platelets) but also the study of the fluid portion, the plasma, in its physical and chemical aspects. Any one of these branches may fully occupy the time of a specialist, but the biochemical and biophysical aspects are more difficult for the general practitioner to apply, as compared with the cytology.

There is a very definite application of blood work in clinical medicine, and the Anatomy Department of the Royal (Dick) Veterinary College has spent a part of its time available for research in investigating this subject.

It must, first of all, be realised that hæmatology (which will hereafter refer to the cytological aspect only) is not of diagnostic or prognostic importance in *every* clinical case. There is a large number of cases where it will be of definite value, but without doubt there are cases where it would be a waste of time to enumerate and evaluate the various cells of the blood. It is the duty of the astute practitioner, however, to choose his cases with care.

Blood terminology has altered considerably during the last 20 years, but at the present time, although rather complicated, it can be grasped after reasonable application. The following paragraphs will enable the practitioner to realise what exactly is needed for a blood examination, and may permit of his assessing its probable usefulness.

The different subjects which can be studied from an examination of the blood are dependent upon the study of its physiology, and more usually of changes which have been brought about by pathological conditions; for, after all, " Pathology is Physiology gone wrong."

The Red Formed Elements of the Blood.—Excepting in Aves (domestic fowl, pigeon, canary, parrot, etc., the hæmoglobiniferous element of the adult domestic animal is non-nucleated, and is therefore correctly termed a red corpuscle, and not a red cell, erythrocyte, or normocyte.

The red corpuscle is studied because of its necessary presence for the carrying of oxygen in the animal body. Physiologically there are, in the fœtus and early infant, nucleated red cells circulating in the general blood stream, but these cells soon lose their nuclei once extra-uterine life begins. The loss of the nucleus, and the acquisition of the full complement of hæmaglobin brings about a series of changes which may be easily revealed by proper staining methods.

Pathologically, there is in the "Anæmias " a hurried production of red elements from the marrow with the consequent introduction of nucleated red cells into the blood stream. The variation which exists, therefore, is measured either by the number of cells, or by their capacity to carry hæmoglobin, and modern technique has given us a simple, rapid and accurate method of carrying out these examinations. There are many diseases affecing the erythrocytopoietic mechanism which would benefit by such routine examinations of the blood.

The number of corpuscles may be normal, but unless they carry the necessary pigment for instable combination with oxygen, they are less useful to the animal. A hæmoglobin estimation is therefore carried out as a routine procedure when anæmia and suchlike conditions are being investigated.

Platelets and Thrombocytes.—The process of " blood clotting " is believed to be associated with the presence in the blood of certain " formed elements " derived from the megakaryocyte. This giant cell of the bone marrow is, in itself, too large to enter and flow through the capillaries. In the mammal, however, the megakaryocyte extrudes portions of its granular cytoplasm which appear in the blood stream as " platelets," which are small numerous masses of cytoplasm staining faintly blue, and exhibiting " azur " granules.

The homologue of this structure in Aves is a definite, nucleated oval cell—the thrombocyte.

The White Cells of the Blood.—These are nucleated in all animals, and can be made to stain easily with aniline or vegetable dyes. They are then classified and a percentage count taken from a given blood smear. In addition, it is very necessary to know the number of cells per c.mm.

Unfortunately, the terminology of human blood is at fault here. The earlier histologists thought that there were two definite classes of white blood cells, those with and those without granules. This, however, is incorrect. It might be thought that the matter could be simplified by studying the cells from a physiological basis, but this is not possible because we do not know the function of all the types of cells. We are, therefore, only able to name *all* the white cells of the blood as leucocytes, and then it is necessary to describe each cell separately from its histological characters. In health there are usually six or seven different types of cells.

The Granulocytes.—This term is used to describe those cells that usually have a *full* complement of granules in their cytoplasm. In man the granules stain very definitely and may be easily classified as basic or dark, eosinophilic or reddish, and neutrophilic or dirty brown—an intermediate colour reaction between the two former shades. The neutrophilic type constitute between 60 and 70 per cent. of the total leucocytes, and are peculiar in that their nucleus may assume polymorphism. Individual segments of the nucleus are termed lobes, and there may be as many as five or six to one nucleus. The term " Polymorph " is used to characterise this particular cell in man.

In the domestic animals there are some differences in the granulocytes. The basic and the eosinophilic granular types are easy to recognise; the " neutrophiles," however, may, in the process of staining, assume shades which appear as " pseudo-eosinophilic," as in the rabbit, fowl, and pigeon. It may be very difficult in these animals to distinguish the so-called neutrophilic type of granulocyte from the eosinophilic, but if the *shape* of

the granules be considered as well as their staining properties the matter is simplified. Although a multilobular nucleus is common in man, the same does not necessarily apply to the lower animals, and the term polymorph is best restricted to man.

The remaining white cells of the blood were formerly termed "*Hyaline,*" but their cytoplasm is now no longer seen to be free from granules or cell inclusions. When appropriately stained, masses of azure or cherry red colour may be seen in certain of the lymphocytes; these cells have usually a clear cytoplasm and a rounded nucleus. Their size may vary considerably; and, depending upon whether they are as large as, or much larger than, the red corpuscle, they are called, respectively, small and large lymphocytes. In point of fact this classification is rather inadequate, since cells intermediate in size are frequently encountered.

In differentiating the large lymphocyte from the last type of blood cell—the so-called mononuclear, or monocyte—the nuclear characters are to be especially studied. In the latter the nucleus is definitely of a striped or linear character, whereas the lymphocyte nucleus is "blobby." The monocyte may have even a full complement of granules, or may only contain azure masses. The nucleus may be round or indented, but the cytoplasm is never neutrophilic in character, but is always blue.

After having enumerated the types of cells, and found the varying percentages of each, it is necessary to interpret any changes observed in disease. This cannot be accomplished unless the normal percentages in health are known. To assist the observer there have been several blood counts suggested. At present only three are commonly used.

Blood Counts.

The oldest of these is the "*Differential White Cell Count.*" By itself it is limited in its application, but when utilised in conjunction with the two succeeding counts it is extremely useful in clinical medicine.

Three hundred white cells are counted and classified. In disease conditions these vary greatly. A fall in the eosinophiles and basiphiles is indicative of pyogenic infection; and in even a moderate degree of toxæmia both types of cells will be absent from a given count. Bacillary infections raise the number of neutrophilic granulocytes both relatively and absolutely, and in conditions involving the lymphatic system of the body (tuberculosis, nasal catarrh, lymphadenitis, etc.) there is a well-marked increase in the lymphocytes.

Schilling Count.—In 1926 Schilling published in German a full account of this blood index; but this has been translated into English by Gradwohl. For this "count" only the "polymorph" is used.

It must be remembered that the mother cell of the neutrophilic granulocyte is the neutrophilic myelocyte; with, in addition to its full complement of granules, a rounded nucleus. In order that this nucleus may assume polymorphism there first appears a slight indentation. This is the "young" form. Afterwards the indentation becomes greater, so that the nucleus is sausage shaped, and to this cell is given the name "band form." The comprehensive term to include both types of this cell is metamyelocyte. Finally, with deeper indentations the nuclear mass becomes distorted until lobes are formed, and to this stage the word "adult polymorph" is applied. In normal healthy human blood about 63 per cent. of leucocytes are ordinary "adult polymorphs," with an additional 4 per cent. of "bands."

An infective process of any severity increases the number of "bands," and frequently introduces "young" forms or even myelocytes. Other factors being equal, the higher the percentage of "youngs" and "bands" the graver the prognosis. During the later stages of a severe infection the "youngs" disappear, and the percentage of "bands" becomes less high, until the normal 4 per cent. is once again reached.

All this means that the marrow has been stimulated to produce early, immature forms of the neutrophilic granular leucocytes, and these are the factors which vary and are utilised in diagnosis. Conditions of obscure ætiology may be elucidated by the use of this "count," and the prognosis of any severe infection can usually be stated once the count has been obtained. It must be realised that in hæmatology a *single* blood smear is practically useless; it is repeated counts that are valuable in order to trace the course of any given process.

Arneth Count.—Since this count was first formulated by Arneth at the end of the last century, there have been several modifications introduced. The original Arneth took many hours to ascertain, and so Cooke, in 1914, published his suggested alterations, which, because of their simplicity, were accepted. Later, in 1927, the count was amplified by Cooke and Ponder, who collaborated to produce the "Polynuclear Count." Unfortunately, their title was not well chosen, for the nucleus of the polymorph is rarely more than single and never "polynuclear."

For the modified "Arneth Count," 100 appropriately-stained neutrophile granulocytes were examined. They were then classified according to the number of lobes per nucleus, and a percentage computed. The expression of the final result was, however, rather clumsy, and although several indices were suggested, none was as useful as the "weighted mean" index expounded by Ponder and Flinn in 1926.

If 100 cells be examined it will be seen that their nuclei vary in complexity; some may have one, others two, while even five or six lobes may be present. Whatever the number, the cells are thus classified, and the "weighted mean" is obtained as follows:—

The number of cells in Class I (which includes myelocytes, metamyelocytes, and all adult polymorphs that have unsegmented nuclei) are multiplied by 1; Class II by 2; and so on to Class V, where the percentage number of cells is multiplied by five. The sums are added together, and because 100 cells were originally counted, the total is divided by 100, and the result expressed as a "weighted mean." Thus:—

Class I	47 × 1 = 47
Class II	25 × 2 = 50
Class III	14 × 3 = 42
Class IV	9 × 4 = 36
Class V	5 × 5 = 25
	100) 200
Weighted Mean	2·00

This means that an average cell would possess two lobes to its nucleus.

It is believed by some physiologists that the more complicated the nucleus the older the cell. We do know that the myelocyte and the metamyelocyte are younger cells than the polymorph with a segmented nucleus, but the evidence that a four-lobed nucleus is necessarily older than a three-lobed is still rather uncertain. It can, however, clearly be realised that here we have a very delicate cell count, which will indicate changes more easily than the simple differential count, but only, of course, changes which affect the neutrophile. Since this cell is implicated in all infections, etc., the use to which it is put in clinical hæmatology is very varied.

Should the marrow produce an excessive number of early forms, this will at once be revealed in the " weighted mean " which will fall below normal, and to this is applied the term " shift to the left." The opposite condition, where the cells are allowed to remain in the blood stream a longer time than usual, and so to mature, is called a " shift to the right "—this is one of the characteristics of pernicious anæmia of man.

In order, however, to obtain the best results from the application of hæmatology to clinical work, all three blood counts should be utilised. Fortunately, this has been rendered very simple by Piney. Using his modification of Pappenhaim's method of Panoptic staining, it is possible to make the smear, stain it, and have it ready for examination within 20 minutes. Three hundred leucocytes are then counted and classified according to the Arneth, Schilling and Differential Counts. The interpretation of these counts is not, however, so simple, and requires considerable experience.

The first essentials in hæmatology are a simple, rapid technique, and then the recognition of the various cells. A microscope with mechanical stage, and affording a magnification of about 900 diameters, is requisite.

As many practitioners are unable to spend the time and money involved in modern hæmatological examination, the writer would esteem it a privilege if veterinary practitioners would send him, at the above department, any blood smears from animals in health or disease. He will in each case endeavour to send a full report of the findings to the veterinary surgeon.

The blood films should be as thin as practicable; and, unless the slides or cover slips are perfectly clean, the blood cells fail to spread evenly; this nullifies the counts.

Exhibition of " T.T." Cows.

In the House of Commons recently, Mr. Christie asked the Minister of Health whether he would state his reasons for issuing an order to all producers of certified and Grade A (T.T.) milk forbidding them to send their animals to agricultural shows.

Mr. Greenwood: It came to my notice that the conditions under which animals are housed at shows at which both tuberculin-tested and untested animals are exhibited were such as to involve a serious risk of infection to the tested animals. I therefore informed the producers concerned that I could not in future consent to the temporary withdrawal of animals from licensed herds for the purpose of sending them to a show unless the show is restricted to tuberculin-tested cattle. I may add that before coming to this decision I consulted my right hon. friend, the Minister of Agriculture, and also the Certified and Grade "A" (tuberculin-tested) Milk Producers' Association.

Irradiated Milk in the Treatment of Rickets.

Its Therapeutic Value.

" During the last six months," says the *British Journal of Bio-Physics*, for January, " Dr. Chalmers Watson, Senior Physician of Edinburgh Royal Infirmary, and Dr. T. Z. Finlay, Clinical Officer of the Child Welfare Department of Edinburgh Corporation, have carried out a series of observations with the object of confirming or otherwise the results recorded by German authorities of the use of irradiated milk in cases of rickets. They have communicated their observations to the *Lancet*, accompanied by a Radiological Report by Dr. J. B. King, Senior Assistant Radiologist at the Royal Infirmary. In the first series of 12 cases treated, which form the basis of their communication, the irradiation was effected by the Scholl process; in a subsequent series no less favourable results followed the use of the Scheidt or ' Cold ' Process.

The Scholl and Scheidt Systems.

" In the Scholl system the milk is irradiated in an oxygen-free atmosphere, the oxygen being removed by admixture with CO_2 gas. The milk is irradiated in a water-cooled chamber, the ultra-violet rays being furnished by a quartz mercury-vapour lamp, the milk, in a very delicate film, flowing over a surface three inches from the lamp. The time of exposure to the rays is 45 seconds. The taste of the milk is slightly modified, giving the impression that a little soda-water has been added. Its physical properties seem to be also slightly modified; it appears to be somewhat thinner than the untreated milk. This is apparently due to some alteration in the fat globules of the milk. The bacteriological content of the milk was found on frequent examination to be reduced by about 70 per cent. In Scheidt's apparatus the milk runs from the bottom to the top directly the length of a long quartz tube. For the production of the ultra-violet rays a high-tension electric current is used, which is sent through a vacuum pipe filled with argon gas. With the Scheidt process the irradiation takes place in the cold, and it is therefore spoken of as ' the cold process.' The flavour of the milk is unaltered. Milk is successfully irradiated by both these processes.

The Selected Cases.

"All the 12 cases were good examples of pronounced rickets; eight of them were treated *de novo*, the other four, as stated, having been under skilled hospital treatment for a considerable period before the administration of the irradiated milk. In these four cases all the medicinal and other special antirachitic measures in use were stopped, the same diet being continued, with the exception that six ounces of irradiated milk replaced six ounces daily of the unirradiated high-grade milk in previous use. The dietary in these four cases included 18 ounces of milk daily, the proportion of irradiated to unirradiated milk being one in three. In the remaining eight cases milk entered more largely into the dietary, 36 ounces of milk being given daily, of which one-half was irradiated. Attention was directed mainly to the condition of the wrists, knees, and ankles.

The Results.

" Rapid improvement took place in the condition of the joints, occurring uniformly in all the cases treated. Within 14 days of starting to give irradiated milk it was clear that a remarkable curative influence was at work. In cases of moderate severity radiological evidence of cure was obtained within four to six weeks, and in extreme cases within six to eight weeks. The manner in which the disorderly growth of the cells and imperfect ossification characteristic of rickets gave place to orderly growth and a normal radiographic appearance was surprising. An all-round improvement in the general condition accompanied this change, this being evidenced by increased muscular tone and activity, and improvement in the mental

state of the children. Within seven weeks of the commencement of treatment it was possible to give a demonstration (in the Radiological Department of the Royal Infirmary) of the results of the treatment, which carried conviction to all who saw it."

Grass Sickness in Horses.

The Scottish Department of Agriculture's reply to the National Farmers' Union of Scotland, who had urged for more intensive investigation into grass sickness amongst horses, was communicated to a recent meeting of the Central Executive Committee of the National Farmers' Union.

The Union had pointed out to the Department that losses from such sickness were still increasing, and that more intensive investigation was necessary. They had also asked the Department to convene a conference of all who had taken part in the investigations, of the veterinary surgeons in the different counties who had experience of the trouble, and of representatives from the Union.

The Department, in reply, stated that they had given very careful consideration to the suggestion made, but were of opinion that a conference such as was proposed would not be likely to serve a useful purpose at the present time.

A considerable amount of publicity had been given to the subject, and the work undertaken by the Animal Diseases Research Association had brought them into close touch with veterinary surgeons in the affected areas, from whom the association had received valuable help and advice from time to time.

Suggestions made by individual farmers and others had also received every attention, and the investigators had sought the collaboration of specialists in branches of science who might be able to throw light on some aspect of the disease.

The Department considered that it was desirable to continue the present arrangements, with such modifications and developments as might be demanded as a result of work already done and of such further information as might be gained from time to time.

The Department had undertaken that particulars of the proposed arrangements for further investigations during the coming season would be communicated to the Union as soon as possible, but that some delay would be unavoidable in view of recent changes in the staff of the Animal Diseases Research Association.

Mr. Jarvie, Blairgowrie, thought the reply was very unsatisfactory, and he pressed for some assurance that definite action was being taken in regard to this increasing menace.

Mr. A. R. McDougal explained that the activities of the Animal Diseases Research Association were limited by their funds.

It was ultimately agreed that the Association should be asked for a statement of the result of their investigations to date and of the extent to which further and necessary investigations are being hampered through lack of funds.

The Future of the Heavy Horse.

Speaking at a lunch preceding the opening of the Shire Horse Society's Show, the President, Sir Walter Gilbey, said that, considering the difficult conditions that existed in agriculture, the Shire Horse Society were fortunate in the entries for this year's show, which almost touched the figures of last year, when a special effort had been put forward to make their jubilee show a success. He still thought that in spite of the great advance of motor traction the heavy horse was necessary, from the economic point of view, to the trade of the country. He described as ridiculous the propaganda for ridding the streets of the horse, because for certain trades and for certain distances the horse was an absolute necessity. He welcomed the very gratifying article which appeared in the issue of *The Times* on "The Heavy Horse," and said he "banked" on the statement made in the article as being absolutely correct. It echoed the sentiments of all those who were really interested in the horse and in commerce. The quality of the horses at this year's show would be found to be as good as that seen in the past, if not better. They would greatly miss the presence of members of the Royal Family on this occasion; they were greatly indebted to the King and Queen and every member of the Royal Family for the great interest they took in horses and in agriculture. Sir Walter proceeded to urge farmers to pay more attention to stock breeding, and particularly the breeding of heavy horses. That was one of the sheet anchors of their business. But they must breed from the best.

Mr. C. J. B. Macdonald said that if it had not been for its economic merits the horse would have been off the streets of London long ago. He thought they had surmounted the most difficult time—that just after the War—when every one wanted to have "wheels." For short distances and heavy work traders would stick to the horse.

In Parliament.

Psittacosis.—Mr. Greenwood told Sir George Bowyer that the question of placing an embargo on parrots, with a view to the danger of a spread of parrot disease, was under consideration, though at present he was not satisfied that such a measure was necessary. He had seen a newspaper report of the inquest on Miss Rogers, who succumbed to this disease. The steps taken by his department had been summarised in a memorandum recently issued to local authorities and now on sale. In reply to Mr. Hacking, Mr. Greenwood said that the parrots associated with cases of psittacosis in this country were mostly green parrots imported from South America. He could give no definite assurance that parrots which had been in the country a certain time and had not been in contact with the disease were immune from spreading infection, but the risk was negligible.

Tubercle Bacilli in Milk.—Mr. Greenwood, replying to Mr. Lawther, said that he understood that some samples of milk alleged to have been pasteurised had been found by local authorities to contain tubercle bacilli. Pasteurised and tuberculin-tested (Grade A) milks were not examined for the tubercle bacillus as a matter of routine, and he could not say how many samples had been so examined. He had reports of a few instances in which tubercle bacilli had been found in the milks. He was not aware of any examinations which had shown the presence of bovine tubercle bacilli in children brought up entirely on pasteurised milk.

Deaths from Tuberculosis.—In reply to Mr. Bromley, Mr. Greenwood said that the numbers of deaths certified as due to tuberculosis in England and Wales in 1927 and 1928 were 38,173 and 36,623 respectively. The figures for 1929 were not yet available.

Principal O. Charnock Bradley, of the Royal (Dick) Veterinary College, recently addressed the Edinburgh Rotary Club, the title of his address being "Concerning Grains of Mustard Seed: or, The Importance of Little Things." He told the Rotarians that 800,000 cattle, 6,000,000 sheep, and 900,000 pigs per year, to say nothing about 15,000,000 head of poultry, game, and rabbits, were required for the Smithfield Market.

"Every year from 13,000 to 15,000 tuberculous milch cows are slaughtered in this country, but apparently the number of tuberculous cattle never diminishes. With 2,000,000 milch cows in the country there are only 850 herds which are known to be tubercle free."—*Dr. Salter, in the House of Commons.*

The Veterinary Record.
March 8th, 1930.

Contagious Abortion in Cattle.

Mr. J. R. Barker, M.R.C.V.S., D.V.H., of Hereford, in addressing the South-Eastern Division of the "National" at its meeting at Tunbridge Wells, raised this important question, "Are present methods of combating contagious abortion effective?"

There are, no doubt, some who see little cause for dissatisfaction in the present system, while others would prefer to see the adoption of a bolder policy, having as its ultimate object the eradication of the disease from these islands. In company with Mr. Barker, we have no hesitation in declaring our conviction that the present methods of control are ineffective. At the same time, we can see no solid reason why this state of affairs should be allowed to continue indefinitely. Already in the United States of America we have a striking example of what can be achieved in the struggle against contagious disease by a properly-organised professional staff, and although the difficulties in this country, financial and otherwise, may be great, they cannot for ever be allowed to turn us from our purpose. Certainly in contagious abortion we have a disease of first-rate national importance; more than that, it is a disease which is capable not only of causing great interference with business but also of inflicting grievous financial loss upon the individual stock-owner. So prevalent is the disease that almost any owner of a non-self-contained herd who takes no steps to protect himself would have to be considered fortunate if sooner or later abortion with its accompanying evils did not appear among his animals.

Of the public health aspect of *abortus* infection we will say little here. No reasonable doubt can exist nowadays that occasional strains of *B. abortus* from cattle and swine are capable of producing undulant fever in human beings. Fortunately, in this country up to the present, such cases appear to be extremely rare and ought not to give rise to undue alarm.

It appears to us to be no small merit that Mr. Barker intended his paper to be somewhat provocative; consequently, a good deal of what was said must invite discussion and in places friendly disagreement. Many of the points at issue were dealt with in a comprehensive speech by Dr. W. H. Andrews and by subsequent speakers at the meeting, so that we are spared the necessity of further comment or criticism. We do not refrain, however, from saying that in the matter of diagnosis we find ourselves in hearty disagreement with Mr. Barker. In our view it has been abundantly proved that the serum agglutination test comes as near perfection as can be expected of any biological test, but it should be undertaken in properly-equipped laboratories by persons trained in the work. That the result of the test is occasionally negative in certain circumstances in animals which are infected is well-known, but this is a pitfall which has simply to be borne in mind in order to be avoided.

With regard to treatment, we are old-fashioned enough to believe that, instead of attempting to cure individual animals with chemical products, the proper way to get rid of contagious abortion from herds is by the process of gradually eliminating infected animals and by protecting the healthy from contamination. This is not to say that in certain cases, as a temporary measure, treatment with a vaccine may not be a desirable procedure. Experience in the United States has already shown that under skilled supervision the disease can be eradicated on a large scale. Indeed, in certain respects the person who is faced with the task of controlling abortion is in a fortunate situation. In the first place, a highly efficient test is available for diagnosis. Secondly, there is the fact that calves of reacting cows may be left with their dams for some months after birth and although they may acquire the disease during this period they usually recover from it before reaching breeding age provided they are placed in isolation for a time after weaning. Thirdly, although many infected cows are a potential source of infection at any time, they are particularly dangerous spreaders at the time of parturition, so that it is possible to adopt measures for preventing gross spread. Fourthly, there is no immediate need to dispose of valuable cows with good breeding records, even though they react to the test, provided they are not kept in contact with the healthy stock.

Taking into consideration the economic importance of the disease and the present advanced state of knowledge, it may be reasonably asked whether contagious abortion does not qualify for first place among the diseases which a properly-organised veterinary health service should be called upon to control.

Nineteenth Report of the Development Commissioners for the year ended March 31st, 1929.

The above report, presented in its usual clear style, and concisely recording the activities of the various institutions and services financed through the Commissioners appointed under the Development and Road Improvement Funds Acts, 1909 and 1910, is now available for purchase at any of His Majesty's Stationery Offices, price 4s. 0d. net.

Finance of the Fund.—The Development Fund on April 1st, 1928, had a credit balance of £114,016. To this was voted during the financial year 1928-29 the sum of £400,000. With net profit on investments, interest on loans, profit and proceeds on advances, a grand total of £540,872 was available for disposal during the year. Against this, the sum of £352,094 was advanced by way of grants, £1,945 by way of loans, and £9,315 charged to administration expenses, making a total debit of £363,354 for the year 1928-29, and leaving a balance of £117,518 on March 31st, 1929. To this balance the sum of £300,000 has been provided by Parliament in the Civil Service Estimates for 1929-30. A schedule of grants and loans recommended by the Commissioners during the year ended March 31st, 1929, is given at the end of the report.

Agricultural Research and Education.—The report opens with a reference to the Imperial Agricultural Bureaux which were recommended by the Imperial Agricultural Research Conference in October, 1927, to be established as central agencies for the collection and dissemination of information of a scientific nature relating to various branches of agricultural research and to which agricultural departments in any part of the Empire could refer, and intercourse and interchange among scientific workers be effected. The locations of these Bureaux have now been fixed, and as they are the result of joint action taken by a number of Empire Governments, controlled by a representative Empire Committee and financed by Empire contributions, they are welcomed as a first step in a policy of co-operation by the Governments of the Empire for the promotion of agriculture by enlisting scientific aid. Thus, Imperial Bureaux will be attached to various Institutes as follows:—(1) Soil Science to the Rothampstead Experimental Station; (2) Animal Nutrition to the Rowett Research Institute; (3) Animal Health to the Veterinary Research Laboratory, Weybridge; (4) Animal Genetics to the Animal Breeding Research Department, Edinburgh; (5) Agricultural Parasitology to the Institute of Agricultural Parasitology, St. Albans; (6) Plant Genetics to the Plant Breeding Institute, Cambridge University, for crops other than herbage plants, and to the Welsh Plant Breeding Station, Aberystwyth, for herbage plants; and (7) Fruit production to the East Malling Research Station. It is estimated that £20,000 per annum will be required to maintain the Bureaux, contributed on a proportionate basis, the contributions from England and Wales being assessed at £3,125 and Scotland £500. When the Development Fund was originally started in 1909 there was no suggestion for promoting scientific research for Imperial ends. As time went on, this want was supplied through the agency of the Empire Marketing Board, certain Empire extensions being thereby supported, and the new order of procedure by the establishment of Bureaux is in reality the outcome of pressure from the daughter countries on the mother country.

Research Institutes and Advisory Centres.—Commenting generally on Research Institutes and Advisory Centres, though the work during the year has seen a certain amount of extension to Empire subjects which has aided rather than hindered the general progress of Institutes, in the main it is the special problems of British Agriculture that have been studied. Research Institutes are organised on a national, and Advisory Centres on a provincial basis, and the sharing of sections of work between Institutes, and co-operation in the local work of Advisory Centres has been well maintained. "Reference to the reports of Institutes engaged in investigating disease of live stock, and to the notes given on the work of the Veterinary Advisors, shows how much the study of this group of subjects calls for extension. In relation to the importance of British livestock interests the attention given to health questions has, indeed, been very small, and an increase in the country's resources for studying disease is overdue." In remarking on the improvement of the milk supply and the appointment of Assistant Bacteriologists to most Advisory Centres for the examination of samples of milk and for giving advice to farmers with the object of securing licences for the sale of graded milk or for information about the purity of the milk produced, the report states that "the production of clean milk, while mainly a question of pure water, soap, clean towels, and steam for sterilization, does involve some additional cost; and the number of purchasers who demand clean milk, and are prepared to pay an extra price for it, is so small that in the first place distributors who handle graded milk usually put on a considerable extra price, and relatively little of this extra price reaches the farmer. At present, although an increasing number of farmers in every locality find that the production of graded milk is profitable, the great majority find it not worth while.

The introductory remarks of the report under the heading of "Veterinary Advice" are abstracted in full as follows:—"The condition of affairs that led to the appointment of Bacteriologists does not hold good in Veterinary Medicine. The Veterinary Profession is a well-established one, and in every part of the country the farmer whose animals are ill, or injured, may summon the veterinary surgeon. 'Why then,' it may be asked, 'appoint Veterinary Advisors?' The answer is that the Veterinary Advisor is to be regarded as an advisor or consultant working in co-operation with members of his own profession. He is a specialist and investigator, concerned, in particular, with those diseases of which the general practitioner as a rule has little knowledge. In the case of all common ailments of the larger farm animals the farmer who applied to the Veterinary Advisor for aid would be referred to the local veterinary surgeon. The position in which the Advisor is placed, though familiar in human, is novel in veterinary medicine, and the success of this scheme depends to no small extent on the tact and judgment of the officers appointed. In the first instance appointments in England and Wales were made in Provinces where the risk of friction, because of interference with private practice, was small; but the experience gained in these areas has been favourable, and the extension of the scheme to other areas may now be undertaken without misgivings.

"There is, in fact, as experience in human medicine suggests, a wide field for the consultant in dealing with the lesser-known diseases of domestic animals. Hitherto the time of Veterinary Advisors has been very fully occupied in studying diseases of sheep, or of poultry. Some of these studies have been independent; in other cases work has been done in association with Research Institutes. In Scotland the Animal Diseases Research Association undertakes both central and local investigations. During the year, with the object of strengthening the Scottish staff of workers, the appointment of a specialist in Helminthology by Edinburgh University was arranged for."

Dealing with individual Research Institutes, the following is a brief résumé of the work carried out during the year in those relating to domestic animals:—

Animal Breeding Research Department, Edinburgh University.—The activities of the Department are directed towards the investigation of inheritance, with particular reference to animals of economic importance. The study of inherited defects and sterility in horses has been continued, and from an intensive study of the Jersey breed the important suggestion has emerged that milk yield and milk quality are partly sex-linked characters. The programme includes the identification of the physiological factors affecting the characterization of the fleece, the rôle of the thyroid in determining its qualities, the relationship of body size to wool yield, and the influence of cod liver oil on a higher wool yield in rabbits. The physiology of broodiness and moult has been undertaken and a comprehensive study of embryonic mortality in the fowl made, as many as 11,797 failed-to-hatch eggs having been systematically examined. The Department offers facilities to veterinary and agricultural officers of the Colonial and Dominion Services to spend part of their leave in examining methods and technique employed. The maintenance grant from the Development Fund for the year was £3,825.

Animal Nutrition Institute, Cambridge University:—"Methods have been worked out for estimating the food requirements of cattle, sheep, and pigs in respect to maintenance, live weight increase, and milk. It remains to find a method of measuring the expenditure of food in muscular movement in general, and in particular in those movements associated with work."

Work on reproduction of horses, mating, symptoms and process of parturition, has been continued, and factors affecting fertility in animals are being worked out in detail. During the summer arrangements were made with the War Office Authorities and owners of horses for tests to be made on a number of Premium Stallions. It was found that stallions not infrequently ejaculate few or no sperms in an otherwise normal service and it is expected that this will occasion reduction in the number of fertile services. The grants recommended by the Commissioners to the Ministry for salaries and other expenditure for 1928-29 amounted to £13,445.

The Rowett Research Institute, Aberdeen University:—While the Cambridge Nutrition Institute devotes attention chiefly to the energy requirements of the domestic animals, the Rowett Institute deals with mineral requirements. Analytical work on the mineral contents of pastures in different areas in Britain and feeding experiments by supplying mineral deficiency in kind have been carried to successful issues. The practical application of supplementary feeding has been extended to districts of Kenya Colony, with similar good results. Mineral metabolism and the rôle played in nutrition by such elements as calcium, phosphorus, sodium, potassium, chlorine, iodine and manganese have been and are being worked out. Also, malnutrition and the influence of deficiencies in diet as a causal factor in disease, particularly in regard to tuberculosis, have formed subjects for careful observation. Even the study of human dietetics has not been lost sight of. It has been shown that in school children an increased consumption of milk was followed by an increased rate of growth. An interesting matter in relation to nutritional factors and disease incidence in Kenya Colony tribes is quoted. The Kikuyu is a vegetarian tribe living largely on cereals, the diet of the Masai is chiefly meat, blood and milk. In the former, ulcers and pneumonia are common, and in the latter rheumatoid arthritis and intestinal stasis predominate. The adult Masai is, on an average, five inches taller than the Kikuyu. The maintenance grant recommended for the Institute from the Development Fund during 1928-29 was £11,571.

National Institute for Research in Dairying, University of Reading:—The work of the Institute involves the study of the management and feeding of dairy herds, methods of obtaining and distributing milk, the constitution of milk and milk products, various activities of the dairy, and the technique of cheese and butter making. Questions of milk and public health come within its purview. The Report is quite clear "that it has now been proved that in provincial centres it is quite possible to put a fresh milk, which is free from disease, upon the market at a reasonable price, and with a small percentage of error," and "a study of the results which have been obtained during the past four years has revealed the fact that a steady improvement in the quality of London milk is continually taking place." A difficulty yet to be overcome is to ensure efficient cooling of the milk on farms during warm weather. Two methods of encouraging the production of clean milk are adopted in the milk trade. One is the payment of a bonus, usually amounting to ½d. or 1d. a gallon in excess of the Farmers' Union rates. Another, which is favoured by the Institute, is the receipt by the farmer of an extra price, provided he attains a certain standard of production. Careful attention is being paid to the underlying physiological processes which initiate and control lactation in view of the wide variations in the proportions of fat and solids-not-fat which are found to occur, the profound disturbance of the calcium balance of the blood in milk fever, and other serious factors in relation to disease incidence. Fishiness in butter, oiliness in milk, and red spot in cheese are problems also under consideration. The grant to the Institute from the Development Fund during 1928-29 was £12,320.

Department of Animal Pathology, Cambridge University:— During the summer of 1928 the new School of Pathology was completed, and that portion of it which was to form the central unit of the Department of Animal Pathology in the University was occupied. The laboratories at Milton Road now form the Field Station of the Department. A well-equipped motor laboratory effects contact with farming areas, the lambing season throughout the country being an especially busy period. Many of the investigations relate to diseases of sheep, *e.g.*, "pulpy

kidney disease " of lambs and a relationship to it of a high protein diet; the histopathology of ulcerative enteritis of lambs; caseous lymphadenitis of sheep, its etiology, possible methods of infection and spread in the animal body; the relationship of nematode infestations to malnutrition in sheep and the effects of various drugs on the elimination of the parasites; the phenomena of fertility and sterility and the relation of the anterior lobe of the pituitary gland to ovulation and to sex maturity in the female. Experiments in connection with vaccination of calves against tuberculosis with B.C.G. vaccine are being pursued. Research into suitable methods for the cultivation of certain filterable viruses is yielding promising results. The grant received by the Department from the Development Fund during 1928-29 amounted to £10,000.

Research Institute in Animal Pathology, Royal Veterinary College, Camden Town :—Research work during the year mainly related to anærobic infections in sheep, and bovine mastitis. In the former, both blackquarter bacilli and *Vibrion septique* have been indentified with a disease amongst ewes on Romney Marsh just after lambing, and vaccination with a mixture of both organisms killed with formalin is contemplated. Out of 150 cases of bovine mastitis the prevailing organisms encountered were streptococci, and work is proceeding to define more accurately the characteristics of the numerous strains isolated. The whole bacteriological flora of the udder, both under normal and pathological conditions, is being investigated, including the epizootiology of " summer mastitis," one of the main causes of which is *B. pyogenes*. During the year the grant from the Development Fund amounted to £5,000, and special grants of £300 and £105, in aid of research on bovine mastitis, were received from the Royal Agricultural Society and British Dairy Farmers Association respectively.

Scottish Animal Diseases Research Association :—In remarking on the general scope of activities of the Association, the report states that the staff of trained investigators has been quite inadequate for the development of methods of prevention of diseases which cause an annual loss in Scotland to the extent of at least half to three-quarters of a million pounds sterling, and " the problems involved in the eradication of animal disease are hampered at every turn by the paucity of knowledge of many of the cognate subjects." The Motor Field Laboratory, kindly given by Mr. Falconer L. Wallace, has been used extensively during the year; a whole-time librarian has been appointed to the Association Library. In investigation work there is urgent need for further research into the etiology of braxy-like diseases of sheep and for increasing the output of braxy vaccine. Elaborate arrangements for the experimental study of lamb dysentery to determine the causal agent of the disease were made. Bacteriological surveys of the flora of the fæces were carried out, and all experiments yielded negative results excepting one set involving the use of a type of *Bacillus welchii*, free toxin of which was necessary before infection could be produced. It is now possible to confer a strong immunity on new-born lambs by a serum inoculation. The season's work also suggests that a combination of drug treatment in new-born lambs and certain sanitary precautions are economical means of dealing with the disease. A full programme of investigation into " grass sickness " in horses has been carried out, but the cause of the disease has not yet been discovered. Over a dozen specialists in various branches of science have been collaborating. Arrangements were made to take up the study of louping-ill during the spring of 1929. A sum of not exceeding £4,500 was approved from the Development Fund, to which are added amounts from an Endowment Fund and an amount from local sources.

Institute of Agricultural Parasitology, London School of Hygiene and Tropical Medicine :—In addition to plant infestation, entozoal parasites producing disease in animals are under study. For instance, during the year the infective larva of a stomach worm in sheep, *Ostertagia circumcincta*, has been investigated; also gape worms affecting wild and domestic birds. The grant from the Development Fund amounted to £5,050 for the year.

Research into Foot-and-Mouth Disease :—The expenditure on this account during 1928-29 amounted to £14,500 and the total expenditure from 1924 to March, 1929, was approximately £57,500. The main work of the Committee set up by the Ministry of Agriculture in the former year " has been concerned with the study of the disease in large animals and their treatment by iodine and prophylactic serum; the survival of the virus in chilled and frozen carcases and on various materials which may assist in the transmission of infection; the typing of strains of virus (three types have now been discovered); further experiments on the susceptibility of wild animals; and further attempts to propagate the virus outside the bodies of animals."

Advisory and Local Investigation Service.

The sums granted to the Ministry of Agriculture for the maintenance of Advisory Centres for 1928-29 amounted to £61,888. The report under this heading is very extensive and space limits reference only to the work of Veterinary Advisors.

Armstrong College, Newcastle-on-Tyne :—The Veterinary Advisor gave 22 lectures on diseases of sheep, resulting in good discussions. Inoculations against braxy are now common, the vaccine being obtained through local veterinary surgeons and the inoculation carried out by the farmer himself. Strongyle parasites have occasioned losses in lambs and the Advisor considers that, though grass lands in the Northern Counties have been improved by the sowing of wild white clover and top dressing with basic slag, the thick herbage protects the parasite. Considerable loss from liver fluke was experienced in 1928 following the wet season of the year previous: carbon tetrachloride in capsule proved a valuable remedy: " joint-ill," " swing back " and " grass-ill " in sheep have called for attention.

University of Liverpool :—The Veterinary Advisor has endeavoured to arouse the interest of farmers in the formation of tubercle-free herds, but little progress has been made owing to indifference of the public, and to agricultural depression. Experiments on the efficacy of the Calmette-Guèrin vaccine have been carried out on several farms. The serious losses caused by contagious abortion, an obscure pregnancy disease of ewes in hill flocks, liver rot, and lamb dysentery have claimed the attention of the advisor.

The University of North Wales, Bangor :—Much interest has been aroused by the Veterinary Advisor in liver rot, both in sheep and cattle, and very satisfactory results

have been achieved in the treatment by carbon tetrachloride in capsule. A vaccine and a serum prepared by the Wellcome Research laboratories have been used experimentally for bacillary lamb dysentery, the vaccine being employed for ewes and the serum for lambs. The latter is favoured in North Wales and results appear to have proved its efficacy.

The University of South Wales and Monmouth, Cardiff:—The Zoologist and Veterinary Advisor have given special attention to liver fluke. At several centres demonstrations for the destruction of water snails by sulphate of copper have been given. Demonstrations of the effects of a wash of tobacco and lime against warble were also given, this having been found to give the best results. Veterinary questions in Wales are shared by the Advisors at Cardiff and Swansea. The work chiefly centres round sheep and poultry. In the former, some obscure diseases have been investigated. Fowl typhoid causes considerable loss in the Province, and a new vaccine supplied by the Ministry of Agriculture promises to be of much value. Bacillary white diarrhœa, too, occasions heavy loss to poultry keepers and the Advisor considers that if systematic measures, including the agglutination test, were taken to clear flocks of carriers of infection, the disease could be wholly suppressed.

Special research grants during 1928-29 were recommended to University College, Bangor, for liver rot treatment by carbon tetrachloride; to Liverpool University, for investigation into deaths in ewes at lambing time; to South Eastern Agricultural College, Wye, for a survey of parasitic worms; to Royal (Dick) Veterinary College, for dentition of pigs, and nutrition of chickens. A grant, too, of £500 was recommended for an investigation of milk fever in cows to be conducted by the Hannah Dairy Research Institute and the Royal (Dick) Veterinary College during the year 1929-30. Research Scholarships of the value of £200 were awarded to Mr. J. Y. Bogue, M.R.C.V.S., in Veterinary Physiology, to be taken at the Animal Breeding Research Department, Edinburgh University and at the Animal Nutrition Institute, Cambridge University; and to Mr. J. Morton, M.R.C.V.S., in Veterinary Science, at the Rowett Research Institute, Aberdeen, and at the Animal Nutrition Research Institute, Cambridge University. A Travelling Fellowship was also given to Mr. A. W. Stableforth, B.SC., M.R.C.V.S., D.V.S.M., Royal Veterinary College, London, to visit Germany. The Commissioners approved of the creation of a lectureship in Helminthology at the Edinburgh University, and a grant-in-aid for the same, on the understanding that the responsibility for the appointment of the lecturer and half cost is borne by the University, and also that a fixed number of lectures should be given free of charge to students of the Royal (Dick) Veterinary College.

J. M.

Army Veterinary Service.

London Gazette—War Office—Regular Army.

February 25th.—Lt. (Qr.-Mr.) A. J. Warburton to be Capt. (Qr.-Mr.) February 26th).

Regular Army Reserve of Officers.

February 28th.—Major P. D. Carey (ret. pay), to be Major (February 1st), with seniority January 21st, 1923 (substituted for the notification in the *Gazette* of January 31st).

Reviews.

[**The Principles of Bacteriology and Immunity.** By W. W. C. Topley, M.A., D.SC., F.R.C.P., and G. S. Wilson, M.D., M.R.C.P., D.P.H., London. Edward Arnold and Co., 1929. Price 50s. net.]

This work consists of two volumes and the authors explain in the preface that they have "attempted, on the basis of our personal experience in post graduate and undergraduate teaching, to provide a text book which will be of service to those students of medicine and biology who wish to make a serious study of bacteriology and its application to the problems of infection and resistance."

Volume 1 consists of a description in ten chapters of what is described as General Bacteriology, while the latter half of this volume is taken up with Systematic Bacteriology. Volume 2 is also divided into two parts, the first dealing with Infection and Resistance and the second with the Application of Bacteriology to Medicine and Hygiene.

Some critics will object when they find the description of a disease is not to be found consecutively with a description of the causal organism, but in most instances in a different volume. The disadvantage is not, in our view, a great one, and the very nature of the general lay-out of the work precludes such an arrangement.

Clearly the authors have attempted to be interesting as well as precise, and they have been successful. It is certain that the seriously-minded student who studies the work sincerely will reap his reward, for he cannot avoid deriving pleasure as well as profit. In our view Volume 2 is the better and will prove valuable not only to the serious student of bacteriology but to the clinician.

The work is illustrated with over 240 text figures which, for the most part, are excellent, and a full index to be found at the end of each volume.

The publishers are deserving of high commendation for an excellent production.

The N.B.A. Calendar.

The *N.B.A. Calendar* for 1930 *and Scottish Farmers' Year Book* has now been published, and can be recommended to every student of agriculture and veterinary science as a source of reference by having ready access to which he will profit. It is claimed that it is one of the best and most complete agricultural year books of its kind, containing, as it does, a vast amount of farming and live stock information and guidance compactly and conveniently arranged. Up-to-date and reliable guidance is given on the not too easily understood question of farmers' income tax; Voelcker & Hall's revised tables showing the composition, manurial and compensation values of feedng stuffs are reproduced; there is a comprehensive review of the agricultural position in 1929, with records of the pedigree live stock of the vear, including sale averages, etc.; a Breeders' Directory and Breeders' Tables; a Directory of Officials of the Department of Agriculture for Scotland, Forestry Commission, Agricultural Colleges, and Live Stock Breeds, and kindred Societies in England, Scotland, and Ireland; weights and measures; table showing the weight and average composition of ordinary crops in pounds per acre, and a calendar of the weekly corn markets in Scotland.

Some indication may thus be gathered of the singularly useful character of the reference information provided, and readers will also appreciate the handy form in which the Calendar has been published, for, in addition to being a compact reference book on agricultural and live stock

matters, it also constitutes a convenient writing desk companion, including blotters and ruled pages for notes. An outstanding feature of the publication is the comprehensive "gallery" of beautiful photographic reproductions of notable prize-winning live stock seen at the various shows throughout the year.

The Calendar can be obtained at the price of 1s. 6d. at any railway bookstall, or at newsagents' shops; or direct from the *North British Agriculturist* Office, 377 High Street, Edinburgh, post free, 1s. 10d.

Abstract.

[**The Physiology of the Blood of Chickens.** C. E. Hayden, Department of Veterinary Physiology, Annual Report of N.Y.S.V.C. at Cornell University, 1927-28.]

The author investigated the blood of ten young white Leghorn pullets immediately after moulting. In order to overcome the difficulty of dealing with the nucleated red corpuscles in making a differential count of the white cells, he used Blain's technique of staining the cells with neutral red (1 : 5·000) and fixing with 12 per cent. formalin.

The average red cell count of nine fowls, apparently bled only once, was $2{\cdot}825 \times 10^6$ per c.mm; while at the same time the hæmoglobin content was found to be 74 per cent.

The author's total and differential counts are at great variance with other workers on the same subject.

Author.	Total White Cells.	Lymphocytes. %	Large Mono. %	Polymorphs. %	Eosinophiles. %	Basophiles. %
Hayden	38,888	81·35	1·54	10·28	5·173	1·62
Burnett	17,921	58	5·5	28·8	3·3	4·3
Blain	18,630	32·76	5·65	49·4	8·66	3·63

The average chemical analyses of the blood of nine of these pullets is interesting when compared with the blood contents of the other domesticated animals.

M.G. Per 100 c.c. of Blood.

Sugar.	Urea.	Uric Acid.	Creatinin.	Total Non-protein N.	Calcium.	Inorganic phosphate.	Chloride.
139·19	5·38	2·47	1·10	28·82	9·9	3·96	487·6

In the discussion the author supports his findings, which he claims are due to the improved technique used. The bibliography should prove useful to those working on this subject.

H. S. P.

Irish Cattle Dealer Fined £50.

Successful proceedings were recently taken under the Importation of Animals Act against an Irish cattle dealer and his agent for failing to detain for the prescribed period of six days a consignment of imported Irish cattle. Instead of being properly detained at the farm to which they had been licensed the cattle were taken to market. The Bench took a serious view of the case and fined the dealer £50 and his agent £25.

Divisional Report.

Lancashire Division, N.V.M.A.*

Discussion on "Contagious Abortion and its Relationship to Undulant Fever in Man."

A General Meeting of this Division was held on Thursday, November 28th, 1929, in the School of Tropical Medicine, Liverpool. The President, Major W. G. Burndred, occupied the chair and others present were Messrs. J. Holroyd, W. Woods, R. Hughes, K. D. Downham, H. L. Torrance, W. Kendrick, E. H. Curbishley, E. J. Burndred, P. T. Lindsay, H. T. Matthews, C. T. Trevers, A. B. Mattinson, A. Leyland, W. Fowle, W. Tweed, A. W. Noel Pillers, J. Spruell, and Professor S. H. Gaiger. *Visitors.*—Messrs. E. A. Comer, A. C. Mullen, G. O. Davies, L. B. Sidhorn, E. F. Peek, A. J. Ewing, and Professor Warrington Yorke.

The minutes of the last meeting were read and signed as correct.

Letters of regret for unavoidable absence were received from Messrs. G. H. Locke, J. McKinna, J. H. Wright, J. W. Brittlebank, E. F. Wood, P. Manuel, H. Holroyd, and T. Eaton Jones.

Nominations.—The following gentlemen were nominated for membership:—Messrs. Allan J. Wright, M.R.C.V.S., Macclesfield; G. O. Davies, B.V.SC., M.R.C.V.S., Liverpool; and H. A. Turner, F.R.C.V.S., Manchester.

New Members.—Messrs. G. C. Marginson, M.R.C.V.S., and H. S. Caldwell, M.R.C.V.S., D.V.S.M., were elected members of the Division.

Sheep Scab.—The Secretary reported that at a meeting of the Council, held at Manchester on November 20th, the report of the interview between a deputation from the Royal Agricultural Society and the National Sheep Breeders' Association with the Ministry of Agriculture on the subject of Sheep Scab had been considered, and the Council recommended the following resolution:—"That the Lancashire Division is of opinion that the best method of controlling sheep scab is by double dipping of affected and in-contact animals, the latter to be traced back for six months and that widespread double dipping is not in the best interests of disease control or of the industry. Further, that the Division is of the opinion that the time has arrived when the method of approving of dips should be re-examined, and that the multiplicity of apparently ineffective dips is an important factor in causing the present unsatisfactory state of affairs."

Mr. Pillers moved the above resolution and Mr. Hughes seconded. The meeting went into Committee to discuss the resolution. On resuming the meeting, the resolution was carried.

Eradication of Tuberculosis.—The Secretary also reported that the Council had considered the "Scheme for the Eradication of Bovine Tuberculosis," proposed by the West of Scotland Division, and circulated to all Divisions by the Scottish Branch, and the Council recommended that this subject should be discussed at the meeting in January.

The Treasurer requested permission to remove the names

* Received on January 13th, 1930.

of two members from the register; one of them was in arrears for four years and the other for two years—the latter had removed to another part of the country. This was carried.

Mr. Pillers proposed that a sum of ten guineas be sent to the Equipment Fund of the Veterinary School of the University of Liverpool. Mr. Spruell seconded the proposition, which was carried unanimously.

Name of Division.—Mr. Currishley gave notice that at the next meeting he would propose that the name of the Division be altered so as to include the two Counties in which most of the members resided.

Contagious Abortion and its Relationship to Undulant Fever of Man.

Professor Warrington Yorke, Professor of Tropical Medicine in the University of Liverpool, then initiated a discussion on the above subject.

The following is a very brief epitome of his remarks, which were in the form of a post-graduate lecture. Owing to his having done little or no original research work on this condition, the speaker did not desire to burden the literature with views which could be already found elsewhere. After tracing the history of the disease, he dealt with Melitensis infection in goats and then with Abortus infection in animals other than the goat. When the bacteriology of these two organisms had been discussed, human infection from cattle was dealt with. Finally, undulant fever of man in England and Wales was considered, the speaker referring to his own medical experience.

Professor S. H. Gaiger, opening the discussion, remarked that in thinking about undulant fever he, and perhaps students too, could derive more than a grain of comfort from the fact that it took eminent medical scientists ten years to discover that a coccus was really a bacillus!

In his view, the point of interest to veterinary surgeons was whether or not undulant fever and bovine contagious abortion were one single condition. It was known, of course, that undulant fever originated in Malta and spread to human beings from goats, and also that human beings could get it from cows, sheep and pigs, and it had even been recorded that it could be got from dogs. One instance, quoted by Miss Evans, was worthy of attention, where a human being developed typical undulant fever and it was proved that the disease in that case originated from pigs. The man in question worked in a slaughterhouse for eight years, his only job there being the killing of pigs and the dressing of their carcases. The man drank milk, but only pasteurised milk, and was also associated with the milking of two cows. The serum of the cows was tested, and it was found that they gave no reaction to the agglutination test; it did seem, therefore, that the man must have been infected by the pigs' carcases.

Whilst there were undoubted instances of human beings becoming infected from all those species of animals, there was also evidence that cattle could be made to abort by being given the bacillus from typical undulant fever cases in man, and, looking at the matter from these different angles, they must come to the conclusion that they were dealing not with two races of organisms, but with one single organism, which, by living in different species of animals, and in man, had taken on certain characteristics, and that all the strains originated from one single species. The fact that the organism of bovine contagious abortion showed peculiar characteristics was probably because it lived in the uterus of the cow, the lack of those characteristics in the organism of undulant fever no doubt being due to the fact that it did not live in a similar situation.

Professor Gaiger went on to say that whilst they referred to the disease in cattle as abortion, he thought there was an increasing tendency to call it Bang's disease, because abortion was only at times a symptom of the disease in goats and cattle, in that abortion is at times a symptom of the disease in goats, but there was this difference between the organism in goats and cattle, that the *Micrococcus melitensis* was excreted in enormous numbers from the goat in its milk, whereas in cattle the numbers excreted in the milk were comparativcly few. The fact that in goats one got a mastitis, sometimes in acute form with abcess formation, was probably due to the enormous number of organisms which were being excreted, and on the other hand it might be that the absence of mastitis in cattle was because there were so few organisms excreted; and the fact that human beings were more easily infected by the milk of goats might be explained in this way.

Another interesting point of resemblance between the two diseases, said Professor Gaiger, was in the path of infection. Both diseases seemed to be spread by ingestion, and the organism, having got into the alimentary canal, got into the blood, but thereafter the course taken by the two conditions appeared to be rather different. In goats the organism settled in the spleen and kidneys, and was excreted in the urine. In cattle the predilection seat was the pregnant uterus from where it eventually got into the milk. In both cases the organism seemed to have a predilection seat in the udder and was excreted in the milk.

Professor Gaiger pointed out that Miss Evans had found no fewer than eight serological groups of the organism, and in the case of one serological group the specimens she examined comprised 35 samples from cattle and pigs and no less than five from human beings, showing that probably that group was the most likely to be common to the two or three species.

"To return to the point I tried to make at the beginning," said Professor Gaiger, "it seems to me possible that the *Brucella abortus* and melitensis are really one organism, and that the only reason there are differences is that the organisms are living in different species of animals." He thought a good illustration of that point was that it was now recognised that the abortion bacillus grown from pigs was much more pathogenic to guinea-pigs than the abortion bacillus grown from cattle, showing that residence in a particular species would alter not only the laboratory requirements for growth, but would considerably alter the organism with regard to its pathogenicity.

The time was approaching when attention would probably be directed, in view of the increasing prevalence of undulant fever in man, to the prevalence of the abortion bacillus in milk. One wondered, however, whether there really was that increasing prevalence in the disease in man, or whether it was only an apparent increase due to the publicity on the subject and to the fact that more cases were now being recognised as undulant fever than formerly, and that really they were dealing with something which had always been in existence. The impression he had got from certain figures which had been published, said

Professor Gaiger, was that in human medicine a number of cases of undulant fever might have been diagnosed as mild typhoid cases, and he did not know whether Professor Warrington Yorke could tell them whether it was possible for the two conditions to be confused in that way. It was probable that the question would be raised in this country of the danger of milk from the undulant fever point of view, quite apart from tuberculosis and other diseases, which might lead to a great increase in the pasteurisation of milk, but that remained to be seen.

Mr. W. Woods said that whilst he had not very much knowledge of the subject, the point that struck him was that if this disease was communicable to man it must be somewhat difficult to infect man, because with the amount of contagious abortion there was in the country there must be a very large amount of milk containing enormous numbers of the abortion bacillus, and if the disease was easily communicable to man that would mean that there was a tremendous amount of undulant fever in the country.

Mr. Curbishley asked Professor Warrington Yorke if it was known whether every carrier of melitensis organisms was affected with undulant fever, or whether it might happen that a number of human beings might carry the bacillus without showing any evidence of the disease? He referred to an instance where a veterinary surgeon was found to be carrying the bacillus, but had no symptom of undulant fever, although he had been ill for a very long time. He wondered whether an agglutination test amongst aborting human females would give any information as to whether there was really a danger from milk. The milk question was very important indeed, and it was commonly said amongst farmers and milk producers that the Bang disease—not only abortion, but in all its phases—cost the country, from the farmer's point of view, five or six times as much as tuberculosis.

With regard to Professor Warrington Yorke's statement that cattle usually only aborted once, he thought that was an open question, for the simple reason that most farmers, having a beast which had aborted, did not take the trouble to stock it again, and it was passed on, whereas if it had been kept it might possibly have aborted again. Certainly where beasts had been kept, a good many of them had aborted more than once.

Referring to a Government Order made some years ago with the object of regulating the movements of aborting cattle, and making it an offence to move an animal from premises within a certain time of it having aborted or retained its placenta, Mr. Curbishley said he had never heard of a single inquiry or prosecution under that Order, the explanation being that no provision had been made to ensure that anybody was responsible for the Order being carried out, and therefore it was a dead letter from the beginning. It was a worthy effort, he said, which might have helped them a little if it had been properly organised.

Mr. Curbishley added that the extent to which abortion was present in herds in the milk-producing neighbourhoods of the northern counties was beyond belief, although it was not always recognised that a lot of the trouble was due to contagious abortion.

Mr. Mattinson said Professor Warrington Yorke's paper had been intensely interesting and he was very pleased that he had heard it; moreover, because of the great incidence of contagious abortion it could not fail to be of great interest to veterinary surgeons who were clinicians.

Whilst it was true, as Professor Warrington Yorke had stated, that contagious abortion only occurred in young cattle, it should be made clear that it was not a disease of young cattle in particular. The reason young cattle were affected was that they were infected at the earliest opportunity; they could not get infected until they were in calf, and then they were exposed to infection and aborted. Older cattle that had not been exposed to the infection were just as liable, and possessed no immunity on account of age. That was his (Mr. Mattinson's) experience of his own cattle and other herds. He had had entire absence of abortion for some years, until he got one or two fresh animals, and then cows with their fifth or sixth calf promptly aborted.

With regard to the point that cattle usually only aborted once, the speaker pointed out that there were no definite statistics on the matter, but people who kept their cattle undoubtedly found that it was very rare for an animal to abort three times.

He thought Professor Warrington Yorke had been very non-committal as regarded the relationship between the two diseases which were the subject of his paper, and, although there appeared to be much in common between them, he (Mr. Mattinson) was not at all convinced that contagious abortion in the cow had anything to do with undulant fever in man. In Lancashire, for instance, undulant fever was apparently almost *nil*, but contagious abortion in cattle was common, and therefore it was a little difficult to reconcile the two. It was not impossible, of course, but he thought they ought not to be too precipitate in assuming that Bang's disease in cattle had anything to do with undulant fever in man.

They had been told that undulant fever had increased very much in France, and had spread from the Departments on the Mediterranean border to the whole of the Departments South of Paris, and even North of Paris. Was there, asked Mr. Mattinson, a corresponding increase in cattle abortion? The mere fact that undulant fever was on the increase was interesting from the medical point of view, but from the point of view of their discussion he would like to know whether it was presumed to have any relation to an increase in the infection of cattle by Bang's bacillus.

Mr. Mattinson remarked that he was at a loss to know why the pig had been incriminated, because the drinking of pig's milk was unknown. He thought the idea of infection by the handling of pigs was rather far-fetched, and he would want a lot more evidence before he was convinced.

He would like to ask Professor Warrington Yorke whether he did not think it possible that there was some other organism, not necessarily associated with typical undulant fever, but with some very similar disease. At one time swine fever was believed to be due to a certain bacillus which was now completely exonerated, and he (the speaker) wondered if this was not perhaps the typical undulant fever definitely associated with goats' milk, but a similar type of disease running a similar course, and possibly due entirely to some unknown organism.

Mr. Mattinson concluded his remarks by saying that

he thought the reason the Order referred to by Mr. Curbishley was not enforced was that it could not be enforced. It was almost impossible to take proceedings against a man for selling a cow which was an aborted cow. There could be no legal proof, because a cow could have infected blood and carry its calf the full time, and unless they could bring definite evidence of the date of service, and the time of calving, there was no means of enforcing the Order.

Mr. Burndred (Blackburn) said he would like to add his thanks to those already given to Professor Warrington Yorke for his address. Immediately after the International Milk Congress held in this country last year he (Mr. Burndred) had the opportunity of some most interesting discussions with some of the American milk experts, and he was rather astounded to find that their united ideas with regard to the pasteurisation of milk had been based mainly on the necessity for eliminating, from the milk supply of the cities in particular, the danger of infection with this particular disease which they were discussing. After hearing what Professor Warrington Yorke had said, he was even more mystified than before, because in this country there was an enormous amount of infection of cattle with *Brucella abortus*, and co-incidently with that increase of *Brucella abortus* infection in cattle they had had a great extension of maternity and child welfare work in this country. In the town in which he worked, said Mr. Burndred, his medical colleague had for some years definitely recommended pregnant mothers to take one of the graded milks in preference to pasteurised milk, and as often as possible certified milk. They had heard during the reading of the paper that in America some of the heavy infections were in certified herds. It was obviously the same in this country, and it seemed to him rather strange that where you were having particularly susceptible people fed on fairly strong cultures of this organism you did not find the disease being produced.

He pointed out that both Professor Warrington Yorke and Professor Gaiger had inferred that the disease was not necessarily contracted by a human being by ingestion of milk, but rather that there was a possibility that the infection could be obtained from discharges from or contact with the animals.

Another mystifying point was that apparently, from the data Professor Warrington Yorke had given them, the disease was much more frequent in the male of the human species than in the female.

Mr. Burndred concluded his remarks by expressing agreement with the view put forward by Professor Gaiger, that if public attention was drawn to this disease it might lead to a great extension of pasteurisation of milk in this country. There was a tendency in that direction at the present time, and some of them thought it would not eventually be beneficial to the country.

Mr. Hughes (Oswestry) said they were all indebted to Professor Warrington Yorke for calling their attention to this comparatively new aspect of undulant fever, especially in its relation to the consumption of milk.

He asked whether there was any possibility of infection being carried by "carriers," as in the case of typhoid fever, and also whether milk or urine or blood were capable of conveying infection through inoculation or abrasions of the skin? "It is early days yet in our profession," said Mr. Hughes, "to say that contagious abortion can be communicable to human beings. We know that a great many practitioners in country practices have a lot to do with uterine discharges in obstetrics, and afterwards with the removal of the fœtal membranes, but I do not know that the infection of contagious abortion has been carried into the homes of veterinary surgeons."

The Chairman remarked that, after reading through the literature on the subject, he found that he had all the symptoms of undulant fever, and had had them for a considerable time! He did not think that there was any direct evidence that human beings were being infected from cattle, and he also stressed the point that with such an enormous amount of contagious abortion in cattle, if it was passed on to human beings, as suggested, they would expect to find a lot more undulant fever than there was in fact. "It may be," he added, "that the bacillus is only just becoming acclimatised, and becoming dangerous to man. That has happened in other countries."

Professor Warrington Yorke, replying on the discussion, said he had done his best to present a fair statement of the case, but, as he had told them at the beginning, he did not know a great deal about the matter, and he was afraid he could not answer all the questions which had been put.

He did not know whether there was an increase in undulant fever. There was no doubt that more cases would be recorded in future, but that did not necessarily imply an increase in the disease; it only meant that you were more likely to discover a thing if you looked for it than if you did not.

It had been known for a long time that there were human carriers of this disease, as in the case of typhoid. They were people who had what was known as the ambulant variety of the disease, and possibly in that way those people were a source of public danger.

One of the speakers had suggested that the disease called undulant fever in this country might be due to some other organism than the one which caused abortion in cattle, but Professor Warrington Yorke pointed out that here they had an organism which in all respects resembled *Brucella abortus*, and when it was inoculated into cattle it produced abortion in those cattle, and in those circumstances he thought the onus of proof was on the speaker who had advanced the hypothesis. The speaker asked how long contagious abortion of cattle had been known to exist in this country, and Mr. Hughes replied: "From time immemorial."

"I hope I shall see you again on some future occasion," said the Professor. "I have long recognised the importance to me of the friendship of the veterinary profession. During the long period that I have occupied the Chair of Parasitology I have enjoyed their friendship and their assistance, and I hope my distinguished successor, Professor Blacklock, will enjoy the same assistance."

Professor Gaiger, proposing a vote of thanks, said the large attendance was an indication of what they expected from Professor Warrington Yorke, and they had not been disappointed. Professor Warrington Yorke was always sympathetic to the veterinary profession. He went out of his way to offer his help to the Veterinary School, and they were much indebted to him.

Mr. Hughes seconded the vote of thanks, which was carried with acclamation.

J. Spruell, *Hon. Secretary.*

Victoria Veterinary Benevolent Fund.

Meeting of the Council.

A meeting of the Council of the Fund was held at 10 Red Lion Square, W.C.1, on Wednesday, January 29th, 1930, when there were present: Major F. L. Gooch, Messrs. J. W. McIntosh, G. P. Male, Major-General Sir John Moore, Lt.-Col. P. J. Simpson, Mr. E. Alfred West, Mr. Sidney Villar and Professor G. H. Wooldridge.

In the absence of the President (Lt.-Col. J. W. Brittlebank), the chair was taken by Mr. Sidney Villar (Vice-President). Apologies for absence were received from Dr. O. Charnock Bradley, Lt.-Col. J. W. Brittlebank, Messrs. H. J. Dawes, A. Gofton, G. H. Locke, J. R. Rider, H. P. Standley and W. Jackson Young.

The minutes of the previous meeting, held on October 3rd, 1929, having been published, were taken as read and signed as correct.

Thanksgiving Fund.

The Secretary reported that, as Joint Secretary with Lt.-Col. Brittlebank of the Veterinary Thanksgiving Fund, he was able to state that a total sum of £283 10s. 6d. had been subscribed to the Fund, including a donation from Mr. Warwick Fowle, M.R.C.V.S., of £130 2s. 0d. The Fund had originally been started by an offer made anonymously by Mr. Fowle that he would subscribe £100 if subscriptions to that amount were received from other members. In agreement with Mr. Fowle it had been arranged that the amount received, less expenses, should be divided between the two benevolent funds, giving two-thirds to the Victoria Veterinary Benevolent Fund and one-third to the National Veterinary Benevolent and Mutual Defence Society. This would mean that the Victoria Veterinary Benevolent Fund would benefit by the sum of £186 19s. 2d.

The report was received and it was decided to address to Mr. Fowle the grateful thanks of the Council for his great generosity and to all the other subscribers to the Fund.

Secretary's Report.

The Secretary submitted the following report of new subscriptions and donations received during the past quarter:—

	New Subscriptions. £ s. d.
E. T. Stanley (increase)	1 1 0
R. L. Phillips (increase)	10 6
K. Ollerhead	10 6
P. A. M'Corry	1 1 0
J. Dodd	1 1 0
G. Hobson	1 1 0
J. S. McCann	10 6
E. V. Kelly	10 6
P. J Gaffney	10 6
H. Dolan	10 6
Munster Veterinary Inspectors' Association	5 5 0
A. J. Beeson (special)	1 0 0
L. S. Balls (special)	10 10 0
G. F. Boddie	10 6
C. G. Allen	10 6
H. Burrow	10 6
J. J. Gildea	10 6
J. H. M. Hughes	10 6
P. McManus	10 6
	£27 5 0

	Donations. £ s. d.
T. G. Heatley (Bowls Tournament—balance)	7 6
S. Villar	3 0 0
H. Tudor Hughes	10 6
Capt. W. P. B. Beal	10 6
Mrs. and Miss McIntosh (Whist Drive)	10 0 0
G. Petrie	10 6
Mrs. Whicher (special)	1 0 0
R. L. L. Hart	10 10 0
G. Dunn	1 1 0
R. Eaglesham	10 6
Mark Tailby	1 1 0
Collecting Boxes.	
Central Veterinary Society	3 10 7
F. Chambers	6 6
North of Ireland V.M.A.	2 2 0
W. Jackson Young	2 16 4
J. Wright Conchie	15 3
A. Whicher	3 18 6
J. Martin, Snr.	1 1 0
North of England V.M.A.	2 2 10
E. Whitley Baker	14 0
J. H. Thomson	1 7 0
North Wales Division V.M.A.	10 0
South Counties V.M.A.	1 18 0
J. L. Cormack	3 3 0
S. H. Slocock	1 0 0
J. W. M. Hinton	12 6
Capt. H. Gillmor	1 11 6
Mid-West and South Wales V.M.A.	2 8 6
	£58 19 0

The amount of £10 received from Mrs. and Miss McIntosh was the proceeds of a Whist Drive organised by these two ladies in aid of the Fund, and was sent in the hope that the effort on their part might stimulate others to do likewise.

Of the sums shown above as being received from Mr. A. J. Beeson, Mr. L. S. Balls and Mrs. Whicher, amounting to £12 10s. 0d., special Christmas donations had been made to fifteen of the more deserving recipients on the list.

The report was adopted and it was agreed that the grateful thanks of the Council should be conveyed to Mrs. and Miss McIntosh for their valuable assistance by planning a means of contributing the sum of £10 0s. 0d. to the Fund.

Life Members.—Mr. R. L. L. Hart and Mr. L. S. Balls were elected Life Members of the Fund.

Cases.

No. 14, Widow, aged 74, five children. It was resolved —That the grant in this case be discontinued at the end of the present quarter.

No. 36, Widow, aged 70, two children. The Secretary

reported that this applicant would be eligible for the old age pension in February, and it was resolved—That the grant be continued until notified that the pension was being paid.

No. 43, Widow, aged 68, five children. This case was carefully considered and it was resolved—That the grant of 15s. per week be continued.

No. 53, Widow, aged 46, six children. The Secretary reported that he had asked for a fresh application to be submitted, which was carefully considered and it was resolved—That the grant be reduced to 10s. per week.

No. 57, Daughter of Member, aged 51. It was resolved —That the grant of 5s. per week be continued for the present quarter.

No. 68, Mrs. M. It was resolved—That the consideration of this case be deferred to the next meeting.

No. 90, Widow, aged 29, two children. This case was again considered and it was resolved—That the grant be reduced from 15s. to 10s. per week.

No. 115, Member, aged 65. This case was left in the hands of the Executive Committee with power to continue assistance if required.

No. 127, Daughter of Member, aged 67. Two other sisters. No income. It was resolved—That the grant of £1 per week be continued.

No. 136, Widow, aged 34, two children. Husband died last October. No income. It was resolved—That the grant of 10s. per week be continued.

No. 137, Widow aged 31, two children. The Secretary reported that at the last meeting, the matter was left to the Executive Committee with power to act, as enquiries were not then completed. A grant of 20s. per week was subsequently made, and it was reported that the applicant was now living in slightly improved circumstances.

It was resolved—That the action of the Executive Committee be approved and that the grant be reduced to 10s. per week for the present quarter, after which it would be discontinued.

No. 139, Widow, aged 53. Income £236. Applies for assistance for daughter who is in hospital. It was resolved —That the case was one which the Funds could not assist.

No. 140, Member, aged 70, ill health. The Executive Committee reported that as the case was one of urgency they had made a temporary grant of 15s. per week. It was resolved—That the action of the Executive Committee be approved and that the grant be continued until the member was in receipt of the old age pension, when the case would be re-considered.

No. 141, Widow, aged 65, seriously ill. One daughter. It was resolved—That a grant of 15s. per week be made in this case.

No. 142, Member, aged 51, seriously ill. No income. It was resolved—That a grant of £1 per week be made to the member's wife.

Investments.—The Treasurer reported that he had invested the sum of £200 received in donations during 1929 in the purchase of £200 of the new 5 per cent. Conversion Loan 1949-64. He proposed that in accordance with the privilege attaching to the new issue he should be authorised to convert £200 of War Stock 1929—47 into the new stock.

The proposed action was approved.

From The Veterinarian,

January, 1830.

Licet omnibus, licet etiam nobis, dignitatem artis veterinaræ tueri.—Cicero.

We commence our third volume, and an enlarged series, with feelings of unfeigned and ardent gratitude towards those by whose kind and fostering support our work has arrived at its present growth and maturity. We take to ourselves some pride for having established this mode of communication among the practitioners of the veterinary art, and for having elicited from so many of them information highly useful to us in our neglected and half-educated state, and which would otherwise have lain for ever dormant. It is, however, our correspondents who have made our Journal what it is, interesting and instructive, and not afraid to compete in real value with any which older and better schools on the continent have produced.

Our correspondents were slow in coming forward. With the exception of one short paper from our old and respected friend Mr. King, five numbers were published without one contribution to which the writer vouchsafed to affix his name. This was somewhat disheartening, but it was probably right, and we do not now regret it. Our professional brethren were determined to try and prove us before they identified themselves with us. Our simple claim to their notice and support was, love for our profession, and a determination to vindicate its respectability. This has been our leading star; and, guided by it, we have pursued a steady and undeviating course. The acknowledgement —the valued acknowledgement, and the reward of our consistency, has been, that we have, at the present moment, a list of contributors, of which not only our humble periodical but the veterinary profession may well be proud.

By their kind and effectual support we are not only enabled, but absolutely compelled, to enlarge our Journal; and our plan will undergo a slight alteration, suitable to our increased space. The "Anatomy" will be continued. Some of our readers have told us that it is a very dry portion of our work; others, and including many veterinary students, have repeatedly thanked us for it, as the most valuable division of our Journal.

We shall be enabled to allow many additional pages to our correspondents, although we find that we cannot, even now, give immediate admission to some communications, the excellence of which we truly appreciate.

Every Number will contain an article on the Veterinary Materia Medica. When some practitioners have recourse to drugs almost as numerous as those which occupy the human dispensatory, and others admit not more than half a dozen; and these common and cheap; and, somewhat incautiously, talk of carrying in the pocket all that will or can be wanted:—when several medicaments, on which practitioners of experience and character place no little reliance, as accomplishing a certain indication of cure, are described by others as having an almost opposite effect, and, by a third party, as totally inert, the attempt at, or approach towards some acknowledged pharmacopœia will be evidently most desirable; although these very circumstances will render it impossible for us to class the various articles as we could have wished, and will drive us to the humble and somewhat inconvenient arrangement of an alphabetical order.

Communications as to the power and efficacy of certain drugs, either previous to or after our consideration of them, will be very thankfully received. Every Number will likewise contain some Essay, either on the anatomy or disease of cattle, sheep, or dogs. This, we trust, will be considered a valuable addition to our work.

Our leading article! While we are supported as we now are, and as we will deserve to be, it will not be necessary for us often or long to obtrude ourselves *in propriis personis* before the public. The leading articles will be continued;

but they will be long or short, and more or less prominent, as subjects may present themselves. As much as possible, they will be devoted to useful practical matter; but we shall never lose sight of our grand object, the vindication and improvement of our insulted and degraded profession.

The present year commences under mingled favourable and threatening auspices. We cannot forget that, in the year that has closed, the Committee of Governors—men respectable and honourable, yet labouring under a delusion for which our philosophy and the kindest interpretation of their warmest friends cannot account, and showing that they could never have understood, or to any essential purpose studied, the true interest of the profession over whose destiny they preside, have offered to the great body of veterinary practitioners two of the most flagrant insults which malignity could have devised, or ignorance, folly, or fatuity, have carried into execution. They have excluded the veterinary practitioner from the Veterinary Examiner's Board, and have entrusted the important duty of determining on the competency of the veterinary pupil to members of a different profession, who could not possibly know anything of the matter, and who, feeling their insufficiency, candidly, and honourably, and repeatedly, but ineffectually, petitioned that some veterinary surgeons should be added to their number, to guide and sanction their proceedings; and, more than this, when the Professor of the Veterinary College, whatever different representations of the subject he may have been supposed to have given to different persons, or whatever may have been said as to his *private* wishes, felt himself compelled publicly to advocate the propriety and necessity of such a union.

Then, as if it were not enough that the veterinary surgeon is disgracefully excluded from that board, a place at which, when he had obtained the requisite skill, and knowledge, and reputation, he might challenge as a kind of birthright, the governors have determined that he shall not be admitted as even a subscriber to the College. He is declared to be an outcast from the school at which he was educated, and which he loves. He is denied a privilege most enviable to him, and which he would not, could not have abused—a privilege granted to every other member of society, be his situation ever so low, his character ever so degraded.

Worse even than this! The veterinary practitioners publicly convened, and occupied in the consideration of the *honour* of their profession, disgraced themselves by a scene of disorder, uproar, malignity, and blackguardism, which the annals of tumultuous assemblies will scarcely equal.

This is the dark side of the picture; there is, however, much to relieve it, and to enable us to regard it, if not with satisfaction, yet without despondence. First of all, we would direct the attention of the governors and the professors of the College, and even of the *pro-collegiates* who so distinguished themselves on a late occasion, to the undeniable state of public feeling. Is there an individual competent to judge of the matter who does not censure and wonder? Among the practitioners of human medicine is there a solitary advocate for the exclusion of the veterinary surgeon from his own board of examination?

Among the practitioners of the veterinary art, and who from habit and feeling are interested in the character and prosperity of the College, is there one who is thoroughly satisfied? Among the *personal friends* of the professors or the governors, is there one who does not feel and lament imperfections and errors at headquarters? And from those in the higher ranks of society, and of paramount influence and power, have not some sufficiently intelligible hints been received? What must ere long be the inevitable result of all this? Can negligence and corruption maintain their ground against the force of public opinion?

The influence of the Veterinary Medical Society on the character and worth of the members of the profession, devoting itself, as this society purely does, to the search of truth and the dissemination of useful knowledge, is neither slow nor uncertain.

The veterinary periodicals, so far as their aim and object is honestly the advancement of science, and the reformation, not the destruction, of our national school, are, likewise, exerting no little influence on the public mind—an influence rapidly increasing, and which cannot ultimately be opposed.

In addition to these circumstances, the veterinary surgeons of the next generation will be essentially different in merit and in reputation from many who have been most unjustifiably admitted among us. *A longer residence at the seat of instruction will now be required from every pupil.* We much regret that Mr. Coleman should, in the agitation and nervousness of an introductory lecture, have omitted to state this to his class. The pupil should have been honestly apprised of what he had to expect. The public, however, has not forgotten, nor have we forgotten, that Mr. Coleman has distinctly announced, that no student, admitted after the summer of 1829, will be permitted to apply for his diploma until he has resided at least a twelvemonth at the Veterinary College. The profession will demand that that which has been publicly announced, and which is so just, shall be strictly enforced.

How could the medical examiners so long reconcile it to themselves to admit among us these three or four months' men? *Would they not have felt themselves insulted and degraded had such persons been foisted upon them?*

These things must work their way; and, in the meantime, we are willing to remain silent but not uninterested spectators.

We wish for peace among all parties—among the profession generally; and we will more than meet every overture which has for its object the accomplishment of the purposes for which we have contended: but we and the public are no longer to be cajoled and duped; and if we are forced again into the field, we shall be ready and determined to strike with surer aim at the root and source of all evil.

So far as our friends will afford us room, we shall review or analyse not only every new work immediately connected with veterinary science, but those which have a more distant but important relation to it. Our domestic and foreign journals, medical and scientific, will be laid under contribution; and from every source we shall endeavour to glean a little, occasionally to amuse, and oftener to instruct. We will not be idle, and our readers must, as hitherto, be indulgent.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Mar. 10th.—Meeting of the Editorial Committee, N.V.M.A., 4.30 p.m., at 10 Grays Inn Square, W.C.1.

March 20th—Annual Meeting of the Lancashire Division, N.V.M.A., at Manchester.

A Reprisal.

In the last number of the *Journal of the Royal Army Veterinary Corps* appears a pointed allusion to *civilian veterinary surgeons,* in connection with what was, at least, a very original variation in the use of a humane killer. We have heard it noised abroad, on the parade ground, that some of the militia may be similarly at fault, in not knowing one end of a rifle from the other.

The following abstract from the same Journal is interesting:—

> *"The control of 'Red Worm' is assisted by liming land which has been exposed to infection every three or four years."*

We have heard of the seventeen years locust, and are familiar with the yearly tax collector, but the triennial strongyle is something new.

Mines Department Announcement.

Coal Mines Act, 1911.

Notice to Veterinary Surgeons.

The attention of veterinary surgeons practising in colliery districts is drawn to the fact that Mines and Quarries Form No. 79:—"Certificate that a Horse is free from Glanders," has been published by H.M. Stationery Office, bound in book form, with perforated sheets and duplicate pages to enable the veterinary surgeon to keep a copy of each certificate that he issues. The form in question is that used by veterinary surgeons when certifying horses in pursuance of Clause 1 of the Third Schedule to the Coal Mines Act, 1911, and the Horses in Coal Mines (Glanders) Order of 12th March, 1923, which prescribes the manner in which the horses shall be tested, is printed inside the front cover.

The book containing detachable forms with duplicate pages, is published at 5s. net (by post 5s. 6d.) and can be obtained either directly from H.M. Stationery Office at Adastral House, Kingsway, London, W.C.2; 120 George Street, Edinburgh; York Street, Manchester; and 1 St. Andrew's Crescent, Cardiff; or through any bookseller.

Royal Veterinary College.

We hope that strong support will be forthcoming from our readers for the effort being made at the Welbeck Palace Hotel on Friday next, as announced in our advertisement columns, to raise funds in aid of the Poor Out-patients' Department of the College. Great enjoyment and the performance of your day's good deed will be ensured by attendance at this Dinner, Dance and Cabaret.

R.C.V.S. Council Election.

A further nomination for election to Council has been received, namely, that of Major R. Simpson, F.R.C.V.S., of Carlisle. The complete list of candidates nominated for election is now as follows:—Major J. Abson, Lt.-Col. J. W. Brittlebank, Mr. W. G. Burndred, Mr. J. C. Coleman, Mr. J. L. Cormack, Mr. R. Hughes, Major Hamilton Kirk, Mr. G. H. Livesey, Major D. S. Rabagliati, Mr. W. D. Rees, Major R. Simpson and Col. G. K. Walker.

Personal.

Birth.—Taylor.—On March 3rd, 1930, at 40 Station Road, Beccles, to Pearl, wife of Capt. J. C. Taylor, M.R.C.V.S., a son.

Errata.—In Capt. J. R. Barker's paper "Are Present Methods of Combating Contagious Abortion Effective," published in our issue of March 1st, on page 183, col. 2, line 55—the word "abortion" should read "abortin." Page 189, col. 2, line 1—the word "abortion" should read "abortin."

R.C.V.S. Obituary.

Hill, John Robert, Elmside, Bargates, Leominster. Graduated London, April 28th, 1859. Report of death received February 25th, 1930.

Welch, H. C., 34 The Paragon, Bath, Major R.A.V.C. (retired). Graduated Edinburgh, May 28th, 1894. Report of death received February 27th, 1930.

Export of Live Stock.

As a result of representations made to the Government of Ecuador, the embargo on the importation into that country of live stock from the British Isles has been removed, and live stock will now be accepted if accompanied by official certificates as to the health of the animals and the freedom from foot-and-mouth disease of the districts of origin of the animals and of the fodder for the voyage and the freedom from this disease of the port of shipment and of the route from the district of origin to the port of shipment.

* * * * *

In view of the removal of the restrictions imposed by the Ministry of Agriculture and Fisheries on the movement of live stock in consequence of recent outbreaks of foot-and-mouth disease in this country, the High Commissioner for Canada has informed the Ministry that the earliest date on which the Canadian Minister of Agriculture will consider the issue of permits for the importation of live stock into Canada from Great Britain will be 60 days after March 15th, provided there has been no further outbreaks of disease occur in the meantime.

The Ministry is also informed that the United States of America will consider the issue of permits for the importation of live stock from Scotland as from March 9th, and as regards live stock from England and Wales as from March 15th, provided there has been no further outbreak of foot-and-mouth disease in the country concerned.

Of 27,000 tuberculous reacting cattle originating in New York and slaughtered at Federally inspected slaughter houses during 1926-27, approximately 900 showed lesions of the skin. The majority of cutaneous tuberculous lesions occurs in the skin of the legs.—*Exp. Sta. Rec.*

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Bovine Contagious Abortion.

To the Editor of The Veterinary Record.

Sir,—May I make the feeble excuse of being a native of Frant, within two miles of Tunbridge Wells, to criticise frankly the paper by Mr. J. R. Barker and the discussion held there on January 30th last. I have pointed out in your columns some three years ago where the agglutination test fails—when applied slapdash and without careful thought—both by laboratory and other workers. So much for that.

The fact that a cow will carry her calf to the full time and still be infected, sometimes heavily, has been given scant, if any attention. I have yet to find a better and more economical remedy for epizootic abortion in cows than a *reliable* vaccine consisting of a live culture of the bacillus of Bang. Isolation alone must fail on an infected farm unless one is able to determine which fields have been contaminated and which have escaped contamination, since both urine and fæces, as well as the milk, of infected cows, are known to include the bacillus in their complicated prescriptions.

That isolation may have succeeded in the United States with their vast areas and resources is of little importance to the inhabitants of a congested and impoverished island. The Ministry, as usual, advocate slaughter. I have always found it most important to keep the cows on any particular farm where they are, as there is strong clinical evidence of a plurality of bacilli, or at any rate, virulence. My experience is that a single heavy dose of a *reliable* live vaccine confers life-long immunity from the act of abortion (ruling out sporadic cases of a different etiology), and I can only imagine that the second outbreak recorded by the essayist after seven, eight, and nine years in the self-same cows might reasonably be put down to senile decay.

I have not used, for a number of years, the vaccine

produced by the Ministry, but I must say that the net result from the use of this vaccine was satisfactory. The fact that one could never be certain whether an abscess would result or not while adopting a similar technique would point to a lack of standardisation.

I have experienced sudden deaths following closely on vaccination. The subjects have all been affected with some chronic disease such as Johne's disease and also appeared to suffer from anaphylaxis, which would point to their also being already infected with abortion, and thus their value is more imaginary than real.

Sterility following vaccination, in my experience, is confined, in 90 per cent. of cases, to cows that have already aborted, and I am confident that investigation will prove them to be subjects of low powers of resistance which might reasonably be expected to continue aborting if not vaccinated. Many cows, however, certainly have to be bulled two or three times before they become pregnant. But a change of bulls will usually solve the problem. At the risk of being called unscientific, I must confess that I have little difficulty in diagnosing the condition. But perhaps this is partly due to the frequency of, and familiarity with, the operaton of removing the unsightly "cleanse," and I suggest that those not in favour of the live vaccine should perform this operation more frequently, and observe the wretched condition of cows which have aborted, and offer spiritual—since there is no material—consolation to the farmer faced with ruin.

A point which I have long wished to have explained to me is—Why do cows carry their calves after vaccination, if they are so dangerously infected? Whereas I have known cows which have aborted three times in succession before being so treated, to have relinquished the habit after treatment. Is this view, that they are so dangerous to other cattle, like the diagnosis, another bogey? I have no sympathy with those who consider all criticism destructive. Many aspects of the disease have not been given full attention, and it would appear that the most useful weapon we have against this fell disease is coming under the ban of the powers that be, or at any rate is being discredited through a few isolated cases of maladministration. This attitude, I think, should be strongly contested.

In conclusion, I must congratulate the sub-committee of the R.C.V.S. for preparing a concise and exhaustive system for solving the knotty point of accurately describing the markings of horses. A leaf might usefully be taken out of their book on the subject of abortion.

Yours faithfully,
E. B. D. Hall.

Wiveliscombe,
Somerset.
March 1st, 1930.

The N.V.M.A. and Appointments.

To the Editor of The Veterinary Record.

Sir,—With reference to the appointments "banned" by the N.V.M.A. and those who secured them at the cost of disloyalty to the other applicants and to the profession, may I be allowed to ask what action (if any) has been taken by our governing body, and if it applies (or will apply) equally to all the offenders?

The rank and file expect those gentlemen who have been elected to represent and guard the profession to see that there is no slackness in discipline, and that, without fear or favour, decisive action will be taken in all cases of this kind.

Vis Unita Fortior.

Thanking you in anticipation of your being good enough to find space for this letter in your columns.

I am, Sir,
Faithfully yours,
R. F. Wall.

128 Queen's Road,
Bayswater.
London, W.2.
February 27th, 1930.

The Veterinary Surgeon in Fiction.

To the Editor of The Veterinary Record.

Sir,—I am indebted to Dr. G. W. Clough for drawing my attention to "Essays at Large," by Solomon Eagle (J. C. Squire), William Heinemann, Ltd., London, 1929, containing a five-page appreciation of "A Veterinary Surgeon."

"I never thought I should spend half-a-day reading about the nerves and muscles, the livers and midriffs of the horse," writes J. C. Squire, after reading the 1687 reprint of "The Anatomy of a Horse, etc," by Andrew Snape, Junior, who was Farrier to His Majesty James II. "Time was when veterinary science, like military science and every other science, was in close contact with the humanities, and when it was not considered strange that an expert writer on farriery should use the tropes of a poet and the periods of a pulpiteer and delight in the exercise of that faculty for good speech with which God had endowed him." Snape's "manner of writing was sometimes that of the curious Coryat or the waggish Fuller, and sometimes reminds one of the eloquent Taylor of Sir Thomas Browne. He knew his job. He was a practical man if ever there was one . . . . but he had time for reflection, and he saw the horse as part of the Universal Order."

Sir Frederick Smith would have approved such commendation of His Majesty's Farrier even though he would have corrected the layman's statements that Snape's "accounts are clear and first hand, his plates look so good that I imagine them to be still valid." Smith tells us (*vide* "The Early History of Veterinary Literature, Vol. I, 1919, p. 337) that Snape consulted the text of Ruini, many of whose plates he also copied without acknowledgment, though in his introduction he cautions the student "that he do not trust too much to these copies." But who would not excuse this lapse in one who wrote with "a reverent and humble spirit, less common among writers now than it was in the seventeenth century, or at any rate less easily disclosed?"

I have dipped here and there into Snape's Anatomy—the 1683 edition is in the library of the R.V.C.—so that I might shake hands with out farrier-ancestor for having given such delight to an eminent essayist.

One thing which pleased me about the book described by J. C. Squire—the 1683 edition was published by T. Flesher at the Angel and Crown in St. Paul's Churchyard, but the 1687 reprint came from J. Hindmarsh, at the Golden Ball, against the Royal Exchange in Cornhill. How delightful to have one's *magnum opus* published at the Golden Ball against the Royal Exchange; I like the Angel and Crown, but I should always choose the Golden Ball for my publisher. The bookshop of J. Osborne in Paternoster Row (*circa* 1740) bore the sign of the Golden Ball, also the shops of silk mercers and the dens of quacks and fortune tellers in Moorfields (*vide* Larwood and Hotten, 1898 edition). Snape was a fortunate author; I do believe, Mr. Editor, that "the tropes of a poet" would grace our scribbles if we were enabled to address you *at the Silver Fleam, against Gray's Inn.*

Yours faithfully,
Tom Hake.

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The Editor acknowledges the receipt of the following:—

Communications from Mr. W. P. Blount (Edinburgh), Dr. H. H. Curzon (South Africa), Mr. G. A. Davies (London), and Captain H. A. Idenden (Transjordania).

Reports of meetings of the Midland Counties, North Midland, and Lancashire Divisions, N.V.M.A., from the respective Hon. Secretaries.